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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ANALOGY OF THE GENERATION AND REPRODUCTION OF PLANTS AND ANIMALS.

To the Editor of the Farmers' Register.

I send you the following facts. The first eight numbers are from Mr. Geoffroy, and all the others are collected from Malpighius. Some of the numbers I consider valuable, viz.: the 11th, 12th, 14th, 15th, 21st, 25th, and 26th. Geoffroy's 2d, 3d, and 7th numbers deserve notice. If you think they are worth a place in your valuable periodical you will publish them. WILLIAM B. SMITH.

Nos.

1st. Flowers contain the male and female organs of generation of plants.

2d. The male organs are small bladders, (the apices,) full of a very fine dust; each particle of which is of a particular distinguished form in each species of plants.

3d. When this dust or farina is sufficiently ripe, the bladders break with an elastic force, and throw the dust from them.

4th. The female organ is the *stylus*, *pistillum*, or *tuba*, consisting of several canals, which are open and wide at one extremity; but in the other, nearest to the stalk of the plant, terminate in one or more cavities, where small roundish *ovula* are contained.

5th. Both organs of generation are contained within, and protected by, leaves of different make and color in different plants; which leaves are generally called the *petala* or flowers.

6th. Some flowers contain both the male and female organs, and therefore are called hermaphrodites; others only contain one or the other kind, and thence are named male or female.

7th. Those flowers which are only male or only female, either grow both from the same root, or the male only grow on one plant and the female upon another of the same species; from which such plants are said to be male or female.

8th. When the male farina, or dust, is prevented from having access to the female organs, either the *ovula* do not increase into seeds, or if they do grow, they are deformed, do not contain any germ or rudiment of the young plant, and are not prolific.

9th. When the fecundated *ovula* increase, the germ, or young plant of each, is seen lodged in a pulpy substance named the *seminal leaves;* which again adhere to, and frequently are sunk some way into a depression of a membrane, which forms a little bag for containing a liquor; and therefore this bag is called the *amnios.*

10th. From this side of the *amnios*, opposite to to that where the germ, with its *seminal leaves*, is fixed, a tube (the *umbilicus*) goes out to be continued to the *uterus.*

11th. Before the umbilicus reaches the uterus, it passes through a cavity formed by another membrane that is full of liquor, or contains a great number of small vessels distended with liquor; and therefore is compared to the *chorion.*

12th. The chorion and amnios become more and more turgid with liquors for some time; but then the liquors begin to diminish, the chorion being soonest emptied, and the navel string shrivels away till it can no longer be observed.

13th. In the mean time the germ and seminal leaves increase apace.

14th. At last all the liquors in the chorion and amnios are consumed; their membranes contract and shrivel; the seed is sufficiently large and confirmed; the small peduncle, by which it adheres to the uterus, shrivels, turns hard and brittle, and the seed fall off with the least force.

15th. The seed is composed of its membranes or teguments, of a large farinaceous part, and of the small germ joined to the farinaceous substance by a small peduncle, which is inserted into the germ, between the *caulis*, stalk, or plume, and the radicle, or small root, of this young plant.

16th. The germ is evidently the young plant, where the plume and root may plainly be seen.

17th. When the fecundated seed is sown at the proper season, the farinaceous substance soon becomes softer, and the germ stretches its stalk upwards and its roots downwards.

18th. The farinaceous substance either remains under ground, turning larger for some time, but having its substance changed more and more into a milky liquor, or it is extended upwards in form of one or two pulpy juicy leaves. From the different forms which this farinaceous substance takes, it is called the *cotyledons*, *seminal leaves* or *lobes.*

19th. After some time, the lobes begin to shrivel, and to have their liquors consumed; and at last, when their juices are all wasted, they fade away and fall off.

20th. The plant grows very fast all this time.

21st. When the cotyledons are taken off before the plants are put into the earth, scarce any of them will vegetate, and all perish very soon.

22d. Those that advance any, after being thus deprived of their cotyledons, increase rather in their plume than root.

23d. When the seminal leaves are taken away, after allowing the plant to vegetate so far as to come above ground, it perishes in a little time, the roots generally fading first.

24th. If the cotyledons are taken away later, most of the plants die, and those that continue to grow are always very small.

25th. When only one cotyledon is taken away, the plants do grow, but are not near so large or strong as the others that are left entire.

26th. By taking away the plume, when it first sprouts above ground, the roots grow very large and quickly.

Remarks by Alexander Monro, Sen., M. D., on the preceding 26 numbers.

"To fix an analogy here between animals and plants, it will be necessary to determine how long either of them should be said to remain in the state of a *fœtus:* which, in my opinion, ought to

be understood so long as the young creature is nourished solely by liquors furnished by the uterus of the parent; but as soon as it is supplied any other way with all or any part of its nourishment, it can no longer be looked on as a fœtus.

"If this is agreed on to be the distinguishing character of a fœtus, it will be evident, that we are to regard plants as fœtuses while the seed is ripening, and before the earth, water, moisture of the air, &c., have been communicated immediately any matter for its increase: and, in this case, it will appear most probable, that the umbilicus pours in liquors from the uterus and chorion into the amnios, from which it is taken up by the vessels of the seminal leaves, to be conveyed partly into the fœtus, and partly into the leaves themselves; by which the plant is increased, and its parts are explicated, and a substance is provided for nourishing it afterwards, when its tender roots either can receive from the earth very little, or any thing less than is necessary for the sufficient growth of the plant.

"In running this analogy between animals and plants, you will observe the mixture of the mechanism of the viviparous and oviparous animals in the nourishment of the fœtuses of plants. For the little plant having, as in the viviparous animals, a communication with the uterus of the parent till it is fully formed, the whole quantity of the liquor it is to be nourished with is not at first to be seen, as the albumen is in the egg; but the uterus furnishes the liquor to be gradually absorbed by the cotyledons or *placenta:* and then, on the other hand, plants resemble the oviparous animals, in so far as the parent being incapable of supplying any juices prepared in its own body, after the fœtus is separated from the womb, for the nourishment of the plant; and the young plant not being in condition, for some time, to subsist entirely on the new nourishment it must receive, the farinaceous cotyledons, or pulpy seminal leaves, do the same good office to the plant, as the *vitellus* does to the chick after it is hatched.

"Since the resemblance is so great between animals and plants, it would be superfluous, after what has been said of the former, to enter into a particular detail of the reasons of the foregoing phenomena of plants; and it is almost needless to say, that I would conclude both the oviparous animals and plants to favor my opinion of the whole nourishment of all fœtuses being conveyed by particular absorbent vessels, and not by the ordinary canals through which the aliment must pass after the creature is out of its fœtus state; for these are obvious to any who reads with the least attention."

EXTRACTS FROM WILLIAM B. SMITHS "REMARKS ON THE VEGETABLE KINGDOM, SOILS, &c.

Delivered before the Cumberland Agricultural Society, April 10th, 1840. Continued from Vol. VII., page 385, Farmers' Register.

Communicated for the Register by order of the Society.

Diseases of plants—curative indications, &c.—Plants and animals, being governed by similar laws, are in all probability subject to similar diseases; this, I suspect, will be admitted by every individual who has paid attention to vegetable and animal pathology. When the plague of 1665 visited London, not only man and all inferior animals were subject to disease, but the vegetable kingdom suffered in like manner, and gardens, fields and forests were destroyed by the devouring distemper. We have abundant proof, both from history and tradition, that the plagues of every age destroy both kingdoms; and we all know, that our summer and autumnal epidemics are destructive to plants as well as animals.

Doctor Benjamin Smith Barton, who was a distinguished botanist of Philadelphia, inoculated an onion with the matter of small pox, and in sixteen days, (says the doctor,) the onion became eruptive, no doubt the effect of the virus. Plants of all kinds are subject to blights, a most formidable and alarming disease; sometimes a whole plant or tree will perish, now and then a few leaves and flowers only, or perhaps a branch or two will be shrivelled by it, and the rest remain green and flourishing. English writers on gardening suppose blights are produced from cold easterly winds, which are most frequent in England about the latter end of March, or beginning of April. Late writers, who have given attention to this subject, are of opinion that the disease called *blight* originates from insects wounding the tender bark, leaves, &c., in order to drink their fill of sap and other juices.

I suspect every species of plants, their trunks, branches, leaves and fruit, are loaded, throughout the summer and autumnal months, with insects producing disease by the numberless wounds they inflict. It is, then, not at all surprising that plants coated with insects and eggs, during the whole period of their growth, should so often dwindle and die; the astonishment is that they should arrive at any degree of perfection.

In order to remove blights, the curative indications are such as physicians resort to in removing cutaneous or herpetic diseases from the surface of animals, or worms from the alimentary canal. In orchards and forests the trunks of trees should be bored or perforated carefully, and calomel introduced, care being taken not to wound the pith. This will destroy insects on the tender twigs, leaves, flowers and fruit; insects that pierce the bark may be destroyed with lime water, or sulphur and hog's lard, externally applied. The best application, however, is a solution of corrosive sublimate, say 20 or 25 grains to the pint of water: wash the trunks of trees with this solution once a week, or oftener if necessary. Such applications cannot be resorted to in small tender plants, but we may destroy the eggs deposited by insects in the seed before they are sown. To do this, immerse the seed in a solution of corrosive sublimate for twelve hours; 20 grains to the quart of water will be sufficiently strong.

The following compound will destroy the eggs of insects deposited in grain, and prevent smut. Saturate a sufficient quantity of water with table salt; steep grain in this solution 24 hours, and lime it before it is sown.

Some plants are distended with sap, and require bleeding, like man and other animals laboring under inflammatory action. A cure may generally be effected by establishing a drain in the trunk, or by

making a circular incision in the bark of the limbs, called by gardeners, "ringing." In correcting the overgrowth and plethoric habit of fruit trees, I would suggest the propriety of propagating another tree upon them, as for instance the mistletoe. This plant is neither propagated in the earth or water, but upon trees and plants only. The ancients considered it a super-plant peculiar to the oak, but it will grow on many kinds of trees. About the first of January, when the seeds are ripe, they may be made to stick upon the bark of the apple, pear, plum, peach, &c. The viscid juice which surrounds the seed will bind it fast, and I suspect it would be useful in correcting the too great vigor of fruit trees, and cause them to bear, by taking off the superfluous juices or superabundant fluids which are destructive to prolificacy in plants as well as animals.

The "rust" is a disease found among many plants thinly sown in moist rich earth. This disease is produced by an over portion of sap and other watery fluids, which distend and burst the tender ends of the vessels; and the fluids so extravasated become indurated or encrusted on the stem or stalk, having the appearance of iron rust.

From what has been said on vegetable pathology, it is probable plants are subject to many diseases which belong to man and other animals, viz., pyrexia or febrile diseases, intermitting, remitting, continued and inflammatory fevers, erysipelas, pestis, hæmorrhage, and many diseases of the cachectic and locales classes; all of which are to be treated upon general medical principles.

As I am ignorant of the great variety of diseases to which plants are liable, I cannot in the present place extend my observations any further.

Agriculture not reduced to a science, the necessity of reading, &c.—I cannot conclude this vegetable outline, imperfect as it is, without connecting it with agriculture; for the vegetable kingdom would not probably have found a place among the catalogue of the sciences, but for husbandry.

"And the LORD GOD took the man, and put him into the garden of Eden, to dress it, and to keep it." (Gen. chap. ii., 15th verse.)

"And Abel was a keeper of the sheep, but Cain was a tiller of the ground." (Gen., chap. iv., 2d verse.)

It would seem, from the above quotations, that agriculture had its origin at a very early period, and yet it is not reduced to a science! Man has been busily engaged in tilling the earth for the last six thousand years, his thirst for knowledge has been great, he has had the experience of all who lived before him; and still has much to learn. Indeed, he has been taught but one lesson through life, viz., "Paul may plant and Apollos water, but the increase comes from GOD." He alone can give the necessary agents in order to produce the evolution and growth of plants.

Those who wish to become skilled in medicine, law, or theology, must pursue a course of hard study for many years; but this period will not give us a knowledge of agriculture; for it requires unceasing and unwearied attention through life; hence the necessity of agricultural reading. A few hours' daily study, will make us good lawyers, priests, physicians, mechanics, statesmen and farmers, and without *daily reading*, our republican institutions, both civil and religious, will be overthrown, and we shall find ourselves surrounded with poverty and ignorance.

The soil and subsoil.—The soil is, properly speaking, nothing more than the surface of the earth in which plants grow; it is of various depths, having a dark color from the decomposition of vegetable and animal matters. This decomposed organic mass is generally called soil or mould, which distinguishes it from the subsoil. Soils vary very much in fertility and texture, and are called rich or poor, stiff or light, &c. The fertility of soils is known by a greater or less proportion of mould which enters into their composition. Forest soils, or virgin soils, are for the most part unmixed with earthy matters, and more or less peaty; on the other hand, cultivated soils are blended with earths. Fertile soils are called loams, as light loams, peat loams, dry loams, wet loams, &c.

Subsoils are distinguished from soils by the absence of mould, they are divided into two classes, viz., earthy and rocky, as clay subsoils, lime subsoils, sand subsoils, rocky subsoils, and so on. Rocky and earthy subsoils are either retentive or porous; retentive subsoils are close and impervious to water, formed of stone or clay. Porous subsoils are loose and open in their texture and water readily filters through.

Shallow soils on retentive subsoils are easily inundated with rains, or become arid from drought. Such soils on porous subsoils drain off water too freely, and become easily exhausted by heat. Deep soils then, on either retentive or porous subsoils, are to be preferred, and the best subsoils are those which are neither too retentive or too porous; a medium between the two is desirable.

Favorable and unfavorable indications of soils and subsoils.—The depth of the soil and texture of the subsoil claim the attention of the agriculturist. A soil from 6 to 12 inches deep, resting upon a limestone subsoil, is one of the best indications. Such soils are found in valley of Virginia, and some of the western states.

In eastern Virginia, the medium depth of soil does not exceed six inches, the subsoil clay and silicious sand; these soils are very good and susceptible of a high state of improvement; but, to the geologist, the indications are unfavorable; for the greater the depth of soil, the more favorable the indication.

Shallow soils, on silicious subsoils, are not to be relied on, and such indications are considered unproductive.

Shallow soils, resting on a feldspar subsoil, produce well and can never become exhausted; for the lime contained in the feldspar supports and feeds the soil. Hence it is that gray soils are, when worn, easily reclaimed; for they generally rest on sandstone or feldspar foundations. Soils resting on white clay, or pipe clay, are unproductive. White earths, white plants, and white animals, are distinctive marks of weakness. Age, which is the parent of weakness, gives a white color not only to the earths, by bleaching and destroying all extraneous matters, but robs the vegetable kingdom of its characteristic green, and gives to the animal kingdom a white skin with white hairs.

Rains that run off with the soil, leaving exposed to the rays of the sun the subsoil, must be considered an unfavorable indication.

Rains that are absorbed and sink in the soil, forming reservoirs of water on the subsoil, may be considered one of the most favorable indications.

A gray soil, presenting on its surface white quartz, mica and sandstone, is thin and weak, having little or no subsoil: this is an unfavorable indication. Gray soils, with pale yellow subsoils, generally grow acid plants, as young pines and sorrels: this is an unfavorable indication.

Soils that produce marine and sub-aquatic plants are generally sterile until the earth becomes drained and pulverized by freezing; then they become the richest and most productive lands. Soils of a dark yellow color, with a deep red clay subsoil, are considered superior soils.

Alluvial soils, when they are of a dark color, are valuable. Oats, barley, rye and corn, flourish and grow kindly in this soil.

From a number of experiments made by Mr. Tillet, he has proved that the best proportions of a fertile earth for corn are

Three-eighths of clay,
Two-eighths of sand, and
Three-eighths of the fragments of hard stone.

Wheat delights in a yellow stiff soil, having clay and lime subsoils.

Tobacco of the finest fibre, and most delicate texture and flavor, is grown on gray soils, having a pale yellow subsoil of sand, clay and gravel. Whereas the coarse, large, rich, dark tobaccoes, are found growing on fertile yellow soils resting on a subsoil of red clay. Clover, herds-grass and timothy arrive at great perfection in such soils, more particularly if they are moist.*

Indications from the growth, &c.—A soil *must* be good, when it puts up luxuriant growth, either in the field or forest; the stems of plants and trunks of trees straight and tall, having many plants and trees of distinct species.

We find on the richest soils in the United States, viz., in the Mississippi valley and its tributary streams, the buck-eye, cherry, ash and sugar maple; with an undergrowth of vines, May apple, puccoon and Indian turnip. Such trees and plants are considered the best test of rich loams in the west.

The next soil, in fertility, grows walnut, mulberry and red bud, with a thick undergrowth of papaw, spice wood, &c.

Third. Poplar, locust and sycamore, with an undergrowth of hazle-nut.

Fourth. Hickory, oak and pine, with an undergrowth of rich weed and angelica. This soil, after cultivation, grows dock, poke, Jamestown weed, and wire grass, all of which are considered indications of rich earth. This was the native growth of the highlands of Virginia, and her soil originally was perhaps the best in the United Sates.

Fifth. Oak lands interspersed with heart pine, having an undergrowth of whortleberry, should be rejected, the soil is silicious and thin, requiring a constant accession of water and manure.

Sixth. Red-oak lands are not rich, but have generally a clay foundation, and produce wheat kindly.

Seventh. White-oak lands interspersed with gum are not to be relied on; they are, however, valuable on account of timber and the quantity of food they afford for hogs.

Eighth. Post-oak lands, with an undergrowth of haw, produce fine crops, but when worn they are hard to reclaim.

Ninth. Chestnut-oak lands are considered sterile.

Tenth. If we are to judge of the soil from its growth, the most unfavorable indication is dwarf black-jacks, with dead limbs covered with moss, interspersed with chinquepin bushes and occasionally lightwood knots and stumps of pine. Such lands, when cleared and cultivated, put up poverty grass, sassafras bushes and blackberry vines.

Eleventh. Prairie lands are fertile and valuable in proportion to the depth of soil; the best and deepest prairie soils are without forest trees, the soil being light, causes the growth to be shaken by winds and prostrated in storms. Or it may be owing to the circumstance that such soils are peaty from luxuriant coats of vegetation, and are unfavorable to the growth of forest trees. Various opinions have been given us by geologists on the subject of prairies; the most plausible is that those extended fields were originally lakes or seas, in which vegetable matters were partially decomposed, and a rich mould left after the waters receded: but they have never given a satisfactory reason why such lands are not clothed with the growth of the forest. Prairie lands are very fertile, growing sward, and thickly covered with many species of plants. Generally speaking, all the rich and more nutritious pasture grasses are to be found on prairie lands.

* Chaptal says, "a proper soil is that, 1st. Which affords a sufficiently firm support to prevent the plant from being shaken. 2d. Which permits the roots to extend themselves to a distance with ease. 3d. Which becomes impregnated with humidity, and retains the water sufficiently, that the plant may not be without it when wanted. To answer these several indications, it is necessary to make a proper mixture of the primitive earths, for none of them, in particular, possesses them." See Elements of Chemistry, by M. J. A. Chaptal, page 451.

ON THE DEANSTON FREQUENT DRAIN SYSTEM.

As distinguished from and compared with the furrow draining and deep ploughing of the Midland counties of England. In a letter to the Editor. By the Right Honorable Sir James Graham, Bart., M. P., F. R. S., &c. Read Feb. 20, 1839.

From the Franklin Farmer.

A recent inquiry addressed to me by the Lord Spencer, relative to the "Deanston frequent drain system," induces me to believe that I may render some service to agriculture, if I am so fortunate as to direct the attention of your readers to this important subject at this particular time.

The great object of our quarterly publication is, as I conceive, the establishment of an authentic record of practical experiments; and by multiplying facts and proofs of this discription agriculture will be treated as a science, and will advance, and the transactions of our society will become the depository of useful information, verified by the name and the address of the several correspondents.

Mr. Smith, of Deanston, in the county of Perth, was examined as a witness before the agricultural

committee in 1836. He gave a detailed account of his system of draining, which very much resembled the furrow draining of the midland counties of England, except that at Deanston, stone being on the ground, the drains are made with stones and not tiles; and at Deanston the cover of the drain is 22 inches below the surface; whereas, in Leicestershire and Northamptonshire the top of the tile in the furrow is not so deeply laid. Mr. Smith, when his land is effectually drained, lays it down without a furrow; in the midland counties the furrow is carefully preserved.

Mr. Smith, after draining, for the first rotation at least, does not bring to the surface any of the sub-soil: but by a plough of his own invention, which follows a common plough turning up the surface he penetrates the subsoil to the depth of 20 inches, and breaks and pulverizes the lower crust without bringing it to the top. This subsoil plough, such as Mr. Smith has used, is a heavy implement, requiring the draught of four, six or eight horses, according to the tenacity and strength of the substratum.

Mr. Smith contends that the sub-soil, by being moved, becomes pervious both to air and moisture; and the efficacy of the drains are thus perfected and perpetuated, and that the character of the subsoil itself, when relieved from superfluous moisture, and open to atmospheric influences, is entirely changed, that it becomes mellow and friable, and after one rotation, or a lapse of five years, that it may be brought to the top, by deep ploughing, with safety and propriety, and be mixed with the surface-soil to great advantage.

In the midland counties of England, deep ploughing after furrow draining has been the constant practice; but the use of six horses in a subsoil plough is a novelty in Scotland. In England a portion of the sub-soil is raised at once to the top: at Deanston the sub-soil, though broken, is not so raised, and here the important question arises.—When land is effectually drained, which is the right treatment of the sub-soil? Will you bring a portion of it immediately to the surface by deep ploughing, or will you, with Mr. Smith, delay this operation for some years, until the sub-soil shall have been mellowed, after having been broken and penetrated by the atmosphere?

The advantages of the wide circulation of agricultural knowledge, of the multiplication of the experiments, and of the interchange both of the theory and practice between Scotland and England, will here develope themselves in the clearest light. Furrow-draining and deep ploughing have been practised in England for half a century; yet the introduction of an analogous system into Scotland is regarded almost as a discovery. But in Scotland itself the greatest difference of opinion prevails on the question of turning up or only moving the sub-soil after draining. Some of the greatest authorities in East Lothian differ from Mr. Smith, and lean to the English practice. In the first furrow for green crop after draining, by two ploughs following each other, which is equivalent to trench-ploughing, they go down to the depth of 12 or 14 inches, and bring a certain quantity of virgin soil.

It is obvious that this difference of practice in the treatment of the sub-soil involves a most important question, which can only be solved by accurate and multiplied experiments. The outlay of capital, which is common to both plans, consists in effectual under draining, and no subsequent management, no fresh application of capital, can be of any avail, unless, on retentive soils or a substratum of clay, the water be quickly carried off. This I take to be an axiom undisputed in agriculture; but after effectual draining, when this outlay has been incurred, the mode of treating the subsoil affects only production, and does not involve expenditure; and greater produce without additional outlay is the grand object of the practical farmer.

We have seen that in draining Mr. Smith uses stones, because he has them on the spot. Tiles are substituted in the midland counties of England, because stones cannot be obtained easily, and because in the clay districts tiles are cheaply and easily manufactured.

It has always appeared to me that skill in agriculture does not so much consist in the discovery of principles of universal application as in the adaptation of acknowledged principles to local circumstances.

The peculiarities of soil and climate, what nature gives or nature withholds in each particular district, must be carefully considered and judiciously investigated, before any given experiment, though locally successful, can be pronounced to be generally useful or universally applicable. The neglect of this consideration has brought agricultural experiments into disrequte, on account of the heavy losses which they have occasioned. If the record now opened in these transactions be faithfully kept, this evil will be averted; for I hope that each experiment detailed will be authenticated by the name of the party who makes it, and that every local circumstance of a peculiar character will be carefully particularized.

My attention having been thus directed to the various treatment of sub-soils after under draining. I tried an experiment, in the year 1838, on a field of about eight acres of the poorest and wettest land. The surface soil is about five inches deep, of black earth of peaty quality: the sub-soil is a weeping retentive clay with sand and rusty gravel intermixed. This clay goes down to the bottom of the drains, which are of tile, laid 30 inches deep, in every furrow.* This field is in a farm lately taken into my own hands, and was rented by the outgoing tenant at 4*s*. 6*d*. an acre. It was in pasture of the coarsest description, overrun with rushes and other aquatic plants.

After draining, on one-half of this field, I used Mr. Smith's sub-soil plough, on the other half I trench-ploughed to the depth of 10 inches by two ploughs following in succession: in the first part not mixed with the surface any of the sub-soil, in the last part commingling the surface and sub-soil in nearly equal proportions. The whole field was heavily but equally manured and planted with potatoes; and though the potato crop even on good land, in this neighborhood, was below an average, yet the crop in this field exceeded an average, and yielded about 12 tons per acre. The field is equally drained in every year. I filled up the tile-drains with porous materials, such as stones, moor-turf reversed, and tops of thinnings of young

* The size of the tiles used was 6 inches for the main drains, and 3 inches for the common drains. The tile drains were laid 10 yards apart.

plantations, to the exclusion of the retentive clay which held the water. The crop of potatoes was so equal throughout the field that I am unable to pronounce positively which part was the best; but I am inclined to give the preference to that portion where Mr. Smith's sub-soil plough was used. Since the potatoes were taken up the land has not been ploughed or ridged up, but remains perfectly flat; and I observe, where Mr. Smith's sub-soil plough was used, that no water whatever, notwithstanding the wetness of the season, has stood upon the land; where trench-ploughing was adopted, and a portion of the clay brought to the surface, after heavy falls of rain the water has stood for a time in hollow places; and here the land, in consequence, would seem to be rather soured. The field will be sown out this spring with oats and grass seeds, and I shall watch with anxiety the future effects of the past different treatment.

In the meantime I have relet the farm: the outlay in draining and extra ploughing cost me £6 18*s.* 4*d.* an acre;* but the field in question, which was valued at 4*s.* 6*d.* an acre to the out-going tenant, is rented by the incoming tenant at 20*s.* an acre on a lease of 14 years.

On a small field of very retentive clay, of a hungry and bastard kind, intermixed with rusty gravel, I tried six years ago, the experiment of trenching with the spade after close and careful draining; I buried the surface soil, which was poor and exhausted; and I brought the sub-soil to the top from the depth of 18 inches. I limed this land and sowed it out with grape and grass seeds. It has been very unproductive ever since, and all my expenditure upon it, hitherto, has been thrown away; for, though dry, it bears no more grass than before the draining. I think, however, that the surface soil is now mellowed by exposure to the atmosphere; and I am about to break up this field and to put it through a rotation, in the confident hope of increased production. I have also ordered a field of 20 acres, of dry and good land, cropped out by a bad tenant, to be treated with a view to this experiment on sub-soil. The field lies in two ridges on the bank of the river Esk: the soil is alluvial deposite: on the lower ridge next to the river the surface is a fine loam 12 inches deep, incumbent on a sub-soil of sandy loam 16 inches deep. On the upper ridge the loam does not exceed 8 inches, but the subsoil is a good clay 13 inches deep: in the hands of tenants up to the present time, the depth of the furrow ploughed has never exceeded 6 inches. I have ordered the lower flat to be trench ploughed to the depth of 14 inches, bringing the virgin loam to the top; I have ordered the upper flat to be stirred with Mr. Smith's sub-soil plough, thus breaking the lower crust, without changing the surface. The whole is to be manured equally with bone dust, and a crop of turnips is to be taken.

I shall be happy, at a future time, to communicate the comparative result of this different treatment, and I trust I may be pardoned for my present intrusion, which arises from my anxiety to fix the attention of the farmer on this question of the treatment of sub-soil, which, by judicious mangement, I think may add to the power of production without cost; especially when the surface, by long and repeated cropping, has been exhausted and has become comparatively sterile. At the commencement of our publication I could not omit an opportunity of endeavoring to use it for the legitimate purpose of inviting accurate experiment, with the view of circulating the extending agricultural knowledge.

I have the honor to be,
Sir, your faithful servant,
J. R. G. GRAHAM.

	£.	s.	p.
* 70 rods of draining, cutting, laying the tiles, and uplifting, at 4*d.* per rood,	1	3	4
1500 tiles per acre, at 30*s.* per thousand,	2	5	0
Carriage of do. 6*s.* do.	0	9	0
Do. of turf, &c. for covering the tiles, 70 roods, and cutting do. at 6*d.* per rood, gives per acre,	1	15	0
	5	12	4
Ploughing with the Deanston plough, with four horses,	1	6	0
Cost per acre,	6	18	4

SCALDING SEEDS BEFORE PLANTING.

From the New Genesee Farmer.

Great losses are often sustained by neglecting to *scald seeds*, before planting, for some entirely fail to grow, and others remain a long time in the ground, dormant, when they ought to be up and growing. About a fortnight ago, we planted some seeds of the cypress vine, and being in haste, we could not take time to scald them—they ought to have remained untouched. A week after we got time to scald some; and these are now up, but the former have not yet appeared.

But we write for *farmers* as well as *gardeners*.—Four days ago, we scalded some seeds of the sugar beet, and let them remain in the water. This morning we planted them, and many of them were sprouted. Last year we planted mangel wurtzel without scalding; but we shall not do so again: in the wettest ground, they germinated freely; but in the driest and richest part, they stood far asunder—not half a crop.

We are not aware that any seeds are injured by scalding, though there may be many; and we should be gratified to have extensive experiments instituted on this subject. Some seeds would probably bear more heat than others—we know that some are more benefited than others. The duration of the heat applied will be regulated in some measure by the quantity of water, and the kind of vessel into which it is poured, some cooling much sooner than others. Several quarts of Indian corn may be safely scalded at once.—Other seeds may not need more than a tea-cupful of water; but let it be fuming hot. Remember, however, there is a wide difference between *scalding* and *boiling*; and after the water is applied the vessel should be set away from the fire. On seeds *untried*, it would be prudent to use but little water.

Some years ago, we planted seeds of *cercis canadensis*. Part were scalded and part planted without that preparation. A difference in the germination of perhaps twenty to one, was the consequence—very few of the unscalded seeds growing.

One week in the advancement of a crop of corn or pumpkins is frequently of great account; and

the farmer may be prevented from planting at the right time by accidents, or bad weather. In such cases, let them try this remedy.

AGRICULTURE OF FRANCE.

(Concluded from page 331.)

The wood of France may be divided into six classes: 1. For ship-building. 2. For the use of house carpenters. 3. For the construction of carriages. 4. For joinery. 5. For vine props. 6. For fuel. Oak is chiefly used for the first class; for the second, oak, fir, linden, and aspen trees; for the third, ash, oak, maple, and especially elm; for the fourth, fir, beech, elm, pear tree, apple, cherry tree, cornil tree, aspen, poplar, linden, &c.; for the fifth, osiers, and branches of different trees; that destined for fuel is divided into new and old, and is distinguished by the names, *bois perdu*, *bois carnard*, and *bois entrain*. The cork-tree flourishes on the French side of the Pyrenees, and produces very fine cork-wood.

Under the old government, the *national* forests embraced 3,000,000 arpents, and gave about 12,000,000 franks to the royal treasury. By the revolution, all the forests formerly held by the corporate bodies and the emigrants were annexed to these of the state, which thus were increased to upwards of 4,000,000 arpents. These, added to the forests in Belgium, and on the left bank of the Rhine, in the year 1806, yielded rather more than 70,000,000 francs, according to the budget for that year. All forests above 300 acres were also added to the national domains, and declared inalienable. In the year 1800 the national forests were thenceforward exempted from the land tax. The revolution did not abolish the arbitrary laws under which the private proprietors of woodlands labored. According to these laws, the government appointed persons, who were proper judges of ship timber, to examine all the woods, and to mark such trees as they deemed fit for their purpose, after which the proprietor durst not lay the axe to the roots of them. Besides, no individual proprietor of woodland could cut down his timber, or clear his land, under a heavy penalty, without making, six months previously, a declaration of his intention to one of the conservators, whose report determines the government either to grant or refuse permission to that effect.

To this general account of the woods in France, we shall add some short notices of such trees as are sources of national wealth, independently of the timber which they afford, as an appropriate introduction to our account of the vine husbandry, and the wines of France.

The fine turpentine tree is found in the southern parts of France, as well as in the Isle of Chio, and in the Indies: the juice is the Chio, or Cyprus turpentine of the shops. Considerable quantities of turpentine are also made in the vicinity of Strasburg, from the silver fir; it is known by the name of Strasburg turpentine.

Beech oil, drawn by expression from the *mast* of the beech tree, after it has been shelled and pounded, is very common in some parts of France, especially in the department of the Aisne, and is used instead of butter. After the oil has been extracted from the mast, the *marc*, as it is called, is also used for food, in various ways; sometimes simply as the extraction leaves it, in which state it is also given to poultry, pigs, oxen and cows; or as flour, being ground in a flour mill and boulted; or as a kind of cheese, (fromage,) in which case, as it comes from the press, it is moistened with milk, and put into moulds. In Burgundy and Franche Compté, the marc of walnuts is made into this kind of fromage, after the oil is extracted from it. Walnuts are grown very extensively in France, and a great deal of oil is made from them.

Chestnuts abound in France, particularly in the Limoisin, where the land is almost every where covered with chestnut trees. The fruit serves for food to the country people, but not, as has been asserted, reduced into flour to make bread. Their manner of preparing chestnuts for food is as follows: they take off the first peel or rind, when they are dry, then they boil them a little, to take off the second peel; and afterwards they boil them entirely, to reduce them into a kind of pap. Thus prepared, they are said to afford a pleasant and nourishing article of food to the peasantry of the Limoisin, and other parts of France.

The caper shrub grows in great perfection in the southern provinces, especially in the vicinity of Cuges, between Aubagne and Toulon, where an extensive valley is wholly devoted to the culture of them. The caper is not suffered to grow here, as it does in many places, into a bush; but is made to creep on the ground in long runners; and being cultivated only for the trade, is never left to flower, it being the little bud of the flower that is used for pickling. The fruit also, which resembles a very small gherkin, is pickled; but these have the name of *cornichons*, the French name for gherkins: it is the flower-bud which has the appellation of capers. When suffered to flower, it is a very beautiful shrub.

The islands of Hieres, not far from Toulon, were formerly famous for their orange groves. In the year 1565, Charles IX. visited these islands in a progress he made through the south of France: he was accompanied by the young king of Navarre, afterwards Henry IV. and the Duke of Anjou; and there was then an orange tree so large, that these three royal personages, taking each other by the hand, could but just encircle the stem: it had produced in one year 14,000 oranges. But the climate even of the south of France, is not steadily warm enough for this fruit; the severe winter of 1789 killed every tree in the Hieres, down to the roots; and the trees at present there are only such as have shot up from their roots. Most of the oranges of Hieres are sent to Paris. In these islands, and in some other parts of the south of France, the lemon, citron, date and pomegranate, are not uncommon, the lime is cultivated, especially in Provence.

The trade of almonds carried on in France is considerable, both on account of their oil, and the large quantity of them used in Lent, either shelled or unshelled: a great quantity of the sweet almonds are used in sugar-plums, and of the bitter ones in biscuits, confectionary, &c. The grocers and druggists of France have both sorts from the provinces in the middle and south of France, especially Provence, Languedoc, Tourraine, the county of Venaissin, Avignon, &c. The best

are those of the county of Venaissin; those from Chiron in Tourraine are the worst. The environs of Aix are particularly noted of all parts of Provence, for the abundance of almonds they produce: they are an uncertain produce; a frosty night will sometimes come on, while they are in blossom, which is commonly about the end of January, and in a few hours the greatest part of the crop will be destroyed. At the time when the almonds are gathered, it is a curious sight at Aix to see the women sitting at their doors cracking them for the merchants. The shells being an excellent article of fuel, great interest is made to get the almonds to crack, which is paid by having the shells: a certain measure in the shells, is expected to produce a certain measure without them. The person cracking them has a basket of fruit on one side of her, and another basket on the other side to receive them when cracked: she has a flat piece of stone on her knee, and a bone with a knob to it in her hand; and laying the almond on the stone, she strikes it with the bone, which seldom fails to crack it at the first stroke: it is then thrown shell and all into the receiving basket, and when that is full, the almonds are emptied out upon a large table, and the kernels picked from among the shells. The whole process is performed with wonderful dexterity and rapidity.

Figs are another important article among the productions of Provence, as well as of several other districts of the south of France. The most celebrated is a very small green, or white fig, as it is often called, which grows only in the territory of Marseilles, whence it takes its name of the fig of Marseilles. Brignolles in Provence, a town about thirty miles from Marseilles, is one of the most famous places in the kingdom for the dried plums, which are so well known by the name of French plums. Prunes, or St. Catherine's plums, constitute a lucrative branch of traffic, almost exclusively carried on at Tours and Chatelherault. These prunes are gathered at La Haie, Sainte Maurevaux, Maudion, &c. They are prepared with the greatest care at the places where they are grown; and sent to the merchants of Tours and Chatelherault, who supply every other part of France, as well as foreign countries, with them. The grand purchases of this fruit are made at the commencement of the new year, and of Lent: during the latter season, the demand is particularly great at Paris, and in other large cities and towns in France. Dried plums of excellent quality are also prepared at Agen, Cutroen, Toulouse and Bordeaux.

Mulberries succeed best in the olive climate of France; Tours being the only place north of the maize climate, where they are cultivated for silk with any success; the spring frosts being fatal impediments to their culture in the central, and even sometimes in the southern districts of the kingdom. Considerable experiments have been made for introducing them into Normandy, &c. but without success. In proceeding from Paris to the south, they are not met with till we come to Causade near Montauban; there are a few at Auch, and even at Tours; the district in which they are grown is of small extent. Before the time of Henry IV., the mulberry trees had been propagated for silk-worms only in the Lyonnois, Dauphiny, Provence, and Languedoc; but that king carried them as far north as Orleans; he also planted them near Paris, and attempted to breed silk-worms at the Tuileries, Fontainebleau, and the castle of Madrid, but without success. In the Lyonnois the white mulberry succeeds extremely well, and a great many silk-worms are reared: the worms are kept in houses, and the leaves carried to them. It is a singular spectacle to see whole trees stripped of their leaves, and bearing the appearance of winter when other trees are in full foliage. A second crop of leaves, however, comes out, but not with the beauty and luxuriance of the first; and they are often gathered to give to the sheep and cattle when other food fails. The white mulberry tree bears a more delicate kind of leaf than the black, for which reason they are always given to the silk-worms, as the silk produced from them is of a much finer quality: the fruit is vapid and good for nothing. The leaves are purchased and paid for according to the size of the tree, by those who keep silk-worms, but have not mulberry plantations of their own.

The limits of the olive climate have been already defined: They comprehend a very small portion of the south and south-east of the kingdom. In France, there is a great difference in the quality of the oil produced from them; that of the territory of Aix is reckoned the finest. Here the trees are very small, commonly from about eight to fourteen or fifteen feet in height. About Toulon and Hieres the trees are taller, but the oil is of a less delicate quality. The tree resembles a pollard willow in the general appearance, and is by no means either beautiful or picturesque. The fruit is gathered green for making the oil, but if left to ripen, it becomes almost black. When they are preserved, or pickled, they are salted first for a few days, and then put into jars with oil and vinegar. In most houses in Provence lamps are used in the kitchen instead of candles; and among the lower classes they are used universally. Olive oil is used in them. The wood of the olive tree makes excellent fuel when a brisk fire is wanted; but it partakes so much of the greasy nature of the fruit, that while it burns very bright it also consumes very fast. The time of gathering the olives is soon after the vintage. In the hard winter of 1789, so many olive trees were destroyed by the frost, and during the revolution so few young trees have been planted, that Aix, which was the principal seat of the commerce in oil, has almost entirely lost this, its first and most lucrative branch of trade; and as these trees are many years in coming to perfection, this loss is not likely to be soon compensated.

As there were aides and customs levied on the consumption and export of wine previously to the revolution, it might have been supposed that the quantity of vineyards in the kingdom might have been estimated with a tolerable degree of certainty, yet there is an amazing difference of opinion on this subject. M. de Trone, author of a work on the provincial administration of the taxes, is of opinion, that their extent is 1,600,000 acres. In this calculation, M. Mirabeau coincides; but the author of *Credit National*, who published only one year afterwards, calculates the quantity at 18,000,000 arpents. M. Lavoisier supposes the produce 80,000.000 livres. The economists in the *Encyclopedie*, make the annual produce 500,000,000. This, at an average produce per acre of 175 livres, would give 2,857,142 acres. Mr.

Young, after considering these and other calculations, gives it as his opinion, that the vine is cultivated on an extent, that constitutes nearly the twenty-sixth part of the territory of France, or about 5,000,000 of acres; and that grapes form about one-sixth part of its produce.

The vine is cultivated on all kinds of soil: on the noble and fertile plain of the Garonne; on the richest lands in the vale which extends from Narbonne to Nismes; in the vales of Dauphiny and the Loire; and, in short, on every sort of land in the wine provinces. They are, however, perhaps most generally planted on rocky and inferior soils. The general routine of cultivation is as follows: The vines are planted promiscuously, three or four feet, or two and a half from each other. In the middle of January they give the cutting, *taille;* in March they dig the ground; in April and May they plant the *provins;* in June tie and hoe the *seps*—they are tied to the props with small straw bands—the hoe which is used is crooked; in August hoe again; in October, or if the season has been favorable, in September, the vintage takes place. To plant an arpent of vines costs in all 50 Louis d'or. There are 8000 plants on an acre, 2400 seps. The props cost 500 livres; to keep up the stock of props 30 livres annually. It is three years before the vines bear any thing, and six before the wine is good. The amount of labor per acre is about 2*l*., 12, 6. The net profit varies from 7 to 10 per cent. Great attention is paid in the choice of the bunches, and in freeing every bunch from each grape that is the least unsound. Sixty women are necessary to gather the grapes for four pieces of wine. Such is the general outline of the culture, &c., of the vine in France. The variations from this mode will be afterwards noticed.

1. The province of Champagne, which is now divided into the departments of the Marne and the Higher Marne, has long been celebrated for its vineyards. In this district there are two kinds of wine; the white wines, called *Riviere de Marne* wines; and the red wines, called *Montagne de Rheims* wines. The white wines are produced from vineyards situated in the valleys, and upon the sides of the hills in Epernay, Dizy, Avenay, Cramant, &c. It is a singular circumstance, that the estate of Cumieres, in the midst of so many vineyards celebrated for white wines, and under the same exposure, produces red wines only. The country producing the fine white wine, is all contained in five leagues length. Among all the vineyards on the Marne, the cantons of Hautvillers, Marcueil, Cumieres, and Epernay, are the most advantageously situated. They extend along the Marne; and it is remarked, that the quality of the wine falls off in proportion as the vineyard is distant from the river. Such exposures on the banks of this river produce excellent white wines. The slope which overhangs Rheims is divided according to the quality of its wines: Of these, the wines of St. Thierry are the most celebrated; but the wine properly called *Clos St. Thierry*, which is produced in the archbishopric of Rheims, is the only wine which unites the rich color and flavor of Burgundy with the sparkling lightness of Champaigne. *Clos St. Thierry* holds the same rank among Champaigne wines, that *Clos-vougeot* does among those of Burgundy. Sillery wines, once so famous, were in a great measure composed of the wines produced in the territories of Verznay, Mailly, and St. Basle. They were made by a particular process by the Marshal D'Estrees, and for this reason were long known by the name of *Vins de la Mareschal;* but at the revolution this estate was divided and sold.

In Champagne, and indeed in all the vine districts of France, the south and the east exposures, and the middle grounds, are preferred. In general, throughout this province, the soils proper for vines rest on beds of chalk: they are planted in November and December; the plants are inserted into turfs, or in *longuettes*. Grafting is not in general use. A good plant will last 50 or 60 years. There is not much variety in the grapes of Champagne; the black are generally preferred to the white. There are whole cantons, however, where there are very few black grapes, and yet their wine is in high estimation. In this province, the vine is pruned about the end of February or beginning of March. It is never allowed to rise higher than a foot and a half. At the end of March, or beginning of April, when the thaws have softened the ground, the hoeing commences. The following is the remainder of the routine practised in the vineyards of Champagne; after the cutting in February or March, and the hoeing in March, as already mentioned. 3. They are pruned in April or May. 4. Tied or propped up in the same months. 5. The next operation is the first trimming for the shoots. 6. Pared and tied in June. 7. Second trimming in July. 8. Third trimming in August. The vintage is in September or October.

Many precautions are necessary in making white wine; steeping before pressing makes red wine, the grapes being allowed to remain in the vessels till the first fermentation has begun in the coloring pellicle of the fruit. In making white wine, great care is taken to keep the grapes from the sun; they are conveyed home in panniers, covered with cloths, from which they are not emptied into the press till after sunset: these precautions are necessary to prevent fermentation. From twenty to forty panniers are put into the press at a time; the contents of two panniers produce half a piece of wine. Forty panniers, yield nine or ten pieces of white wine, and each piece contains 200 bottles. The fruit is pressed by three successive and rapid turns of the screw in some districts, and by two only in others. The whole of the operation should be finished in less than an hour. When the three pressures have been effected, the wine produced from the juice is called *vin d'elite*, or choice wine; after this *vin d'elite* is extracted, the remaining juice is pressed out by another turn of the screw; this is called *premiere taille*, the first cut, and is often added to the *vin d'elite*. Another pressure is given at a subsequent period, and the wine is called *deuxieme taille*, or *vin de tisanne;* lastly, a poorer kind of wine, called *vin de rebechage*, is produced by repeatedly pressing the husks till they are perfectly dry. The white wines are clarified with isinglass; they are generally bottled in the month of March. About the middle of August, the fermentation in the bottles begins, and frequently there is a loss by the end of September of from five to ten per cent. by the bottles breaking. When the white wines deposite a sediment in the bottles, very minute care is requisite to extract it. The wines of

Champagne, after being put into circulation, preserve their good qualities for ten years; but when they are kept in cellars of their native province, which are superior from the nature of the soil, (being dug out of beds of chalk,) they will continue good for 20 or 30 years.

The price of an acre (100 rods and 22 feet to the acre) of the best vineyard ground in Champagne, varies from 2000 to 6000 livres; the vineyards at Ay selling as high as 6000 livres. The price of an acre of the second quality varies from 1000 to 3000 livres. The ordinary expense of cutting, hoeing, tieing and pruning the vines, is 80 livres the acre; of occasionally propping such as have fallen, 60 livres; of props, 16 or 18 bundles, 50 in each bundle, 30 livres; dung and carriage of the vines, 42; five puncheons for the produce of an acre, 50 livres; expense of gathering, pruning, &c., 46 livres; making a total expense per acre of 308 livres. With respect to the produce of an acre of vineyard in Champagne, it is generally understood, that taking the average of 10 vintages, five pieces or puncheons of wine are obtained from every acre; three of these are of the first quality, or choice wines, and two of them are ordinary wines. Valuing the three puncheons of the best wine at 150 livres each, and the two others at 50, the total produce will be 550 livres; from which must be deducted, besides 308 livres for labor, &c., the expense of bottling, cooperage, and fining, 30 livres for the best wines and six for the inferior; the annual interest of the money laid out in the ground, 100 livres; taxes, &c., 72; making in all, with the labor, 516 livres; which being deducted from 550, leaves 34 livres as the net produce of an acre of vineyard in Champagne, on an average of years. This net produce, however, it is very difficult to fix, as the wines of Ay, Haut Villers, Epernay, and Pierry, frequently sell for 300 or 400 livres a piece, while some of the other wines do not bring more than 90 or 100 livres.

It has already been mentioned, that this province is equally famous for its red wines, and some parts of the process by which they are made have been hinted at. To make red wine, the black grapes in general are only picked and gathered. The juice is allowed to ferment, and the degree of fermentation is ascertained to be advantageous, when a lighted candle cannot be held over the tub without going out. When the fermentation has entirely ceased, the puncheon is hermetically sealed. About the end of December, and if possible in dry weather, the wine is drawn off. About the middle of May, it is again drawn off. A puncheon of red wine contains 240 bottles. In general, the red wines of Haute Montagne are bottled in the month of November, *i. e.*, 13 months after the vintage. The wines of St. Thierry can remain three or four years on their lees. The best red wines of Haute Montagne, will keep in bottles in good cellars for six, eight, ten, or twelve years. These cellars (already alluded to) are from 25 to 40 feet in depth. Their temperature is generally five degrees of Reaumur below that of the atmosphere; the variations are seldom above half a degree.

The cost of an acre of vineyard, for red wine of the best quality, varies from 900 livres to 2000. That in Haute Montagne bears the highest price; the second class sells from 300 to 900 livres. The annual expense of cultivating an acre of red wine vineyard, including the expense of vintage and of pruning, is about 200 livres.

Such are the general details of the culture of the vine in Champagne. There are many vineyards, however, and particularly in St Thierry, where the greater part of the vines are always raised to the height of about five feet, and supported by props of oak six feet high, and an inch in diameter.

The following are the classes of the white and red wines of champagne.

FIRST CLASS.

White wines.	*Red wines.*
Ay.	Verzieto.
Haut Villers.	Versinay.
Pierry.	Borezy.
Cramant.	Faissy.
	Cumieres.

SECOND CLASS.

Avernay	Mailly.
Epernay	Damenay.
Le Meuil.	Epernay.
Avis.	Rilly.
Oger.	Montbret.
	Ay.
	Pierry.

THIRD CLASS.

Tonnere.	Joigny.
Chaldy.	Tonnere.
Ludes.	Chamery.
Sadu.	Ville Domage.
Troispuits.	Parguy.
Villiers.	Safflecomte.

The first class comprises those wines which have long been considered as luxuries at the French, English, and Dutch tables; the second class comprehends wines, which are not much inferior in flavor and quality to those of the first class; in the third class, are comprised the wines most commonly used in France.

As many of the details respecting the managements, &c. of the vineyards and wines of Champagne, are applicable to the other wine districts of France, we shall be more concise in our observations respecting them.

II. The vines in the Bordelais, and generally in the higher Guienne and Gascony, are not suffered to lie on the ground like those of Provence and Languedoc, but are supported by poles, something like hops in England. The wines produced in this district, are distinguished into Medoc, Haut Brion, Valence, St. Emilion, De Grave, &c. The best Medoc wines, are Lafitte, Latour, and Margouz. Those of *Vins de Grave*, are Haut Brion, Haut Valence, Morignac, Pessac, Laugon, Villenave, &c. The *Vin de Laugon*, so called from a small town near which it is made, is reckoned the best of all the white wines of the Bordelais, which are included under the general name of *Vins de Grave*, from the sandy and gravelly soil in which the vines grow. It has very much of the claret flavor. There are other sorts in different districts, such as St. Julien, St. Manubert, Pouillac, St. Laurent, Ludon, Maçon, &c. Those which hold the first rank among the white wines, are Corbonnieux, Serons, Barsac, Prigniac, Saulerne, Baume, &c. Of the white wine exported from this district, the total annual amount may be from 85,000

to 90,000 tons. From 20,000 to 25,000 tons used to go to the French colonial settlements in the East and West Indies. About an equal quantity was exported to Normandy and Flanders. Those that are called crude wines of Medoc, are almost all exported to England. The red wines of Haut Brion, Valence, and in general those named De Grave, are sent to Holland, Hamburg, and the Hanse towns. The best red wines of Montferat go to Holland. Those of inferior quality, used to go to the French colonies, or the western departments of the kingdom. The white wines of Grave, Carbonnieux, Martillac, Loegnau, &c. are sent to Denmark, Sweden, and the Baltic; but the best of these go in bottles to Paris. The red wines of St. Macaire, formerly went in part for the use of the French navy, partly to Brittany and Normandy, the rest to Bremen and Lubec.

III. Throughout Provence and Languedoc, the *souche*, or stem of the vine, is never suffered to grow higher than about two feet from the ground. The shoots of the year are always cut down to the stem soon after the vintage. The new shoots put forth every year, are of an amazing length. The grapes grow in a large cluster round the roots of them, and are shaded by the shoots as by an umbrella. The cuttings of the vine are made into faggots for fuel. The vintage begins about the middle of September. The ordinary wines of Provence are not held in much estimation; but there are some of a superior quality, the Muscat wines in particular, which are little inferior to Frontigniac. Roquevarre, not far from Nans, is famous for Muscat grapes. Great quantities are dried for raisins. A wine is made in many parts of Provence, called *Vin cuit*. It is not the produce of any particular kind of fruit, but made from any common white grape, the juice being boiled after it is pressed, till it is reduced about a fourth, which gives it a richness and sweetness, not to be obtained by any other process. The Muscat wines are boiled in like manner, as are also the sweet wines. The process of wine-making is very negligently performed in Provence in general; there is no selection of grapes; red, white, ripe and unripe, are pressed promiscuously together. The method of pressing is very rude and simple. A man, and commonly two or three children, pull off their shoes and stockings, and jump into the vats, where they trample on the grapes till all the wine is pressed out. The only sort of grape used for drying, besides the Muscat, is a large white grape called the Panse. Four or five bunches of the fruit are tied together, and then dipped into a caldron of ley of wood ashes and water, as it is boiling over the fire, till the grapes look streaky. Without this process, they would turn black and wither when laid out to dry, instead of retaining their sweetness and moisture. After the dipping, they are hung upon a line for 24 hours, and then separated, and spread upon a sort of hurdle made of reeds, which is laid out in the sun all day, but taken in at night, to protect the fruit from the dew. An excellent sweetmeat is made in Provence, and in other parts of France, by boiling down the juice and pulp of the grape, freed from the skins and stones, till it becomes a rich syrup, when slices of melon, lemon, pears, &c. are preserved in it. It goes by the name of *confiture raisinée*.

IV. The province of Burgundy, in the opinion of many, produces the choicest of the French wines. The best is made at Baom, Nuitz, Romanée, Premeau, Chambertin, Belz, Coulange, Chassane, Volenay, Maçon, and Clos-Vougeot.

V. Wine is also the produce of many other parts of France. A great deal of the wines made in the Beaujolais, are sold under the name of Maçon. The wines of Anjou and Orleannois are thick and heady. Auvernat, commonly called Casse Taille, is made at Orleans, and is a full good wine. Another Orleans white wine is Genetin. Poitou produces a tolerably good white wine, which resembles Rhenish. Hermitage is the produce of a vine, which is grown upon the banks of the Rhone, between Valence and St. Valliere. Near this also, the *Cote roti* is made. It takes its name from the hill on which the vines grow, being fully exposed to the warm rays of the south sun, which contributes so much to the excellence of the wine. The average yearly produce is nearly 1000 hogsheads. The true *Vin de Cahors*, which has a great reputation, is the produce of a range of vineyards, very rocky, on a ridge of hills to the south of Cahors, and is called Vin de Grave, because growing on a gravelly soil. The wine of Condrieaux, a small town in the Lyonnois, on the banks of the Rhone, about seven leagues from Lyons, is very much esteemed. The original plants from which this wine is made, were, according to tradition, brought from Dalmatia, by order of the Emperor Probus.

Luscious wines and liqueurs are common in other parts of France, as well as Provence, of which those of Crotat and St. Laurent are the most esteemed. Frontigniac, a town in the department of the Herault, is remarkable for its excellent muscadine wines. They are the most perfect, and the best adapted for keeping. Lunel, an old town in the department of the Gard, is another place, in the vicinity of which muscat grapes are cultivated in great quantities, the soil being peculiarly suited to them. The muscadine of Lunel is of a more delicate flavor than Frontigniac, but it will not keep so well. The muscat grapes grown here are also dried, and are sent all over Europe. They are called in the country *passerilles*. Aubagne, between Marseilles and Toulon, produces also muscadine wine. The *Malvoisie d'Aubagne*, as it is called, is particularly celebrated. The muscadine of Rivesaltes, a town in the department of the Eastern Pyrenees, is richer than either Frontigniac or Lunel, and comes very near the Cape wine. Bezieres is of a quality inferior to Rivesaltees, Frontigniac, and Lunel. Liqueurs of various sorts are made in different parts of France. Those of Montpellier are most esteemed. In the beginning of the last century, France exported, upon an average of five years, from the year 1720 to 1725, annually, wine to the amount of 20,880,200 livres; in 1778, the exportation amounted to 24,570,170; in 1778, to 33,-032,100. The revolution nearly annihilated the exportation of French wines.

The brandies made in France, are esteemed the best in Europe. They are distilled in every part of the kingdom where vines are grown; and in the distillation, not only wines of an inferior, but also those of the best quality, are used. The brandies most celebrated, or made in the greatest quantities, are those of Bourdeaux, Rochelle, Cognac, Charente, Isle of Rhe, Orleans, the country of Blesois, Poitou, Tourraine, Anjou, Nantes,

Burgundy, Champagne, &c. Brandy is also a great article of trade at Montpellier. It is of a milder quality than most of the brandies of the south of France, and therefore better adapted for making the liqueurs, for which Montpellier is so celebrated. Of all the French brandies, those of Nantes, Cognac, and Poitou, which are nearly of the same quality, are the most esteemed, because they have a finer taste, and are stronger. The English, Dutch, Flemish, and Hamburgers, used to take off the greatest part of these brandies. The brandies of Anjou, Tourraine, Orleans, which are not of so good a quality as those of Nantes, &c. are most commonly sent to Paris, and into Flanders. In the beginning of the last century, the value of the brandy exported, amounted annually to 5,852,900 livres; in 1778, to 4,660,221; in 1784, to 11.360.200; in 1787, to 14,689,600; and in 1788, to 14,657,300.

Vinegar is made in Provence, Guienne, the Orleannois, Anjou, Aunis, Brittany, &c. The Orleans vinegar is esteemed the best. The flavor of the vinegar made in Provence is also good, but being of a red color, from the hue of the grapes from which it is produced, it has a singular appearance to a person unused to it. The exportation of vinegar in the beginning of the last century, amounted annually to 34,400 livres; in 1778, to 141,893; in 1784, to 124,400; in 1787, to 130,900; and in 1788, to 201,700.

Cider is made in most of those provinces, the climate of which is not favorable to the grape. Normandy is particularly celebrated for this liquor, where they also make brandy of it.

We shall conclude this chapter with a few words respecting French horticulture. The fruit gardens at Montreuil are a curious instance of the accumulation of capital in a small space: these gardens are said to be worth 400*l.* sterling an acre. All the occupiers are proprietors. The environs of Lyons are celebrated for their excellent artichokes: they are carefully conveyed in great quantities to the tables of the rich all over the kingdom. Vegetables for the table are also cultivated in great perfection in Provence, and particularly about Aix. The country for some distance without the town, especially on the south side, is a continued scene of kitchen garden. The vegetable for which they are most famous, is what they called *cardes*: a plant very much resembling the artichoke, but not growing to a head in the same way. The roots always make part of a Christmas dinner. Aix is so famous for them, that at this season presents are sent of them from thence all over the country. The salads of Aix also, particularly in winter, are esteemed uncommonly good. The tomato or love apple, the *aubergine* or fruit of the purple egg plant, gourds, and capsicums, are likewise much cultivated in the gardens of Provence. The inhabitants of Roscoff, a town on the northernmost point of the department of Finisterre, particularly apply themselves to the raising vegetables for the table; and in this they are so eminently successful, that Brest, Morlaix, and several other towns, draw their supplies almost entirely from them; and they are sometimes sent as far as L'Orient and Quimper, in the southernmost districts of the department. Cauliflowers, brocoli, cabbages, turnips, asparagus and artichokes, are especially produced here in amazing abundance, and of an excellent quality.

But though France has made great advances in the useful branch of horticulture, she is far behind in the ornamental: The strait avenue, the terrace, and the parterre, with formal basins, and jets-d'eau, are still the only objects which, in the opinion of the generality of Frenchmen, can constitute real grandeur and beauty in a garden.

NOTES ON NORTHERN SILK-CULTURE.

Continued from page 375.

Raw silk. The production of raw silk is, properly speaking, an agricultural operation. The inquiry whether this may be made profitable, concerns directly the agricultural interest; and, under what circumstances it should be encouraged, is a question which I propose to consider.

It has been confidently stated, as I have already shown, that raw silk may be produced among us at current prices of labor, for two dollars or two dollars and a quarter per pound. In the cases referred to, however, no allowance was made for land, buildings, trees, manuring, and the superintendence of the proprietor; but only for the actual labor applied; and in Mr. McLean's experiment, the labor of the man was rated at not more than half its customary value. In Mr. Smith's case not only were these items not charged, but likewise the board of the young women employed was not brought into the account. It seems to me then only fair to rate the cost of raw silk at three dollars or three dollars and fifty cents per lb. At 50 lbs. of silk to an acre, this would be a liberal compensation for labor; and any increase of this product would be an increase of profit without a corresponding increase of the cost of production. But this again is making no allowance for accidents. With our inexperience in the silk culture in this country, we are not prepared to say what allowance should be made on this account. The worms are liable to various accidents. They are sometimes swept away by disease in vast numbers, to the sad disappointment and loss of the industrious cultivator. Hitherto, however, as far as my own knowledge extends, few such misfortunes have occurred. The profit upon the production of silk, must depend, of course not merely upon the price of labor, but upon the value of the article in the market. This will of course again depend somewhat upon the supply. Any considerable increase of the product would, as I have attempted to show, inevitably reduce the value. Prices, too, are fluctuating, especially where there is a mixed currency; that is, a specie currency, and a paper currency, which does not represent specie; and when promises to pay are interpreted and qualified at the pleasure of those who make them. No class in the community is more interested in a sound currency than those farmers, who are obliged to hire any labor, and are dependent upon the sales of their produce. The constitution of the country having fixed a standard of value in gold and silver, every other currency is sound so far as, and no farther than, it represents gold and silver. The defiance of their obligations, which has characterized some of the moneyed institutions of the country, and the persevering attempts in some parts of the country to uphold and force a purely paper currency upon

the community, produce disastrous fluctuations; disturb all the sound calculations of honest industry; and in proportion to his means and concerns, the small farmer suffers as severely as those most extensively engaged in commercial pursuits. It is to the deluge of an irresponsible currency, which was by some institutions at one time poured out like water, that we must in a measure attribute those speculations in the multicaulis mulberry, which brought ruin upon thousands. Attracted by the glittering illusion of sudden wealth, like insects round an evening bonfire, they rushed into the flames, where many perished, or escaped with their legs burnt off or their wings singed, maimed and crippled for life. To the same cause we owe every where the interruption and desertion of the quiet pursuits of wholesome rural industry, for the hazardous, and in many cases the immoral pursuits of speculation. Under these circumstances, whether we undertake to manufacture or to produce raw silk, we can at present make no very safe calculations for the future of what the price of labor will be; or what will be the value of the article after it is produced. The attempt, therefore, to produce silk on any large scale, as well as the attempt to manufacture silk, even sewings, must at the present be an undertaking full of uncertainties, but one can hardly say, of doubtful result. The absence of all duties, upon foreign fabrics, exposes us, also, to all the caprices of foreign labor, capital, and cupidity, and the ebb and flood of foreign markets are felt equally upon our shores. Within the last few months, as I have remarked, the prices of many articles of silk have experienced a decline of more than fifty per cent. The best of sewings silk which not long since commanded nine dollars, now sells for six. Ribbons and lutestrings are even much more reduced.

Some persons, on this subject of the profits of the silk culture, have had their imaginations raised almost to a white heat, and have thought that the product of raw silk in the northern states, might soon be made to equal the product of cotton in the southern portion of the union. Certainly they do not mean in pounds, but in the value of the article produced. But is it not obvious that any such increase of the product of the article would proportionately reduce the price, though this would again be affected to a degree by another element, which must come into the calculation; and that is, the increased use of the article which would follow any considerable reduction of its price. This would not, however, raise the price, because its free use depends on a low price, and bears a direct relation to the diminution of the price. There is, however, no sufficient reason to think that raw silk can maintain its present price in the country, certainly not in the face of any considerably increased production. The present price of raw silk from Smyrna is not much above $4 per pound. Bengal silk is lower.

But our silk is said to be much superior to the Indian silk, as it is said, likewise, that silk raised in the northern provinces of China is much superior to that in the south. I have not been able fully to satisfy myself of this fact; nor, if true, can I ascertain whether it be attributable to the influence of the climate, or the superiority of the reeling; but an intelligent manufacturer has stated to me, that, in his opinion, the Bengal silk would be found equal to any other but for the imperfection of its reeling. It is stated, likewise, on the most disinterested testimony, that the silk formerly raised in Georgia, whose climate, we know, is of a high temperature, was pronounced in England of an excellent quality. The perfection of the Italian silk is generally ascribed to the admirable manner in which it is reeled. It is at the same time, however, only just to state that the silk already produced among us, has fully demonstrated our capacity of producing as good an article as has as yet been seen.

Calculations respecting silk products.—I am aware that I oppose the popular opinion in speaking thus discouragingly of the manufacture of silk in our country. It would be more agreeable to float with the tide than to struggle against it; but whether the opinion of an individual be of little or much weight in the community, he is bound to respect his own judgment, and is at liberty to utter only his honest convictions. Puplic sentiment and public actions can be affected but in a slight degree by the opinions of any individual; and addressing one's self to intelligent and reflecting minds, no evil can result from the freest discussion. No good will come from creating false expectations; I should be glad to disabuse the public mind of some of the gross illusions by which it has been willingly imposed upon. In some of the documents before me, and those published under authority, it has been confidently stated, that an acre of land planted with mulberry trees may be expected to produce the first year one hundred pounds of silk, and afterwards be increased to 333 lbs., and even to 666 lbs.; and that the profits of such cultivation would be $1170 per acre. Another person goes on to calculate that one hundred acres even at 180 lbs. to the acre, and silk at 4 dollars per lb., might be made to afford an income of $72,000. At present these must be considered as mere dreams. If this be practicable, why has it not been done? There has been ample time in other countries, and in this country, to have done it, if it could be done. There have been trees enough, and land enough, and capital enough; and in some of the states a bounty has been offered for some years on the production of silk, admitted by the most ardent friends of the cultivation to be sufficient to cover the whole expense of production. In what country, at what time, was ever such encouragement to production held out before? But no such returns have been obtained or even approached; and, with the exception of Mr. Atwood, before referred to, and Miss Rapp, at Economy, who, until new claimants appear, must be allowed the rank of queen of this branch of domestic industry, it would be difficult, I imagine, to find half a dozen individuals in the whole union who have produced, either of them in one year, one hundred pounds of silk. I myself know not of one. I should have been glad of the honor of recording the names of hundreds who had accomplished it, if they were to be found. Mr. McLean, who has approached more nearly than any other man in the country towards determining what can well be done, admits, with the most credible frankness, that he despairs of ever seeing 104 or 128 lbs. of silk produced upon an acre. I cannot say with him, that I despair of such a result; but I shall wait for further trials before I am prepared to say, with confidence, that more can be done than what his remarkable in-

telligence, skill, and enterprise have affected. In respect to the actual cost of producing silk, that as yet is by no means settled. Mr. Mc. Lean's experiment, which has come the nearest to determining this matter with exactness, is, as I have shown, far from doing it. First, he made no allowance for land, trees, rent of buildings, cultivation, and superintendence. Second, he charged the man's labor and board at half the price, three dollars per week, which it would cost with us. Third, he states distinctly, that *his* silk cost him much more than two dollars a pound, though he thinks that it may be produced for this sum; that is, as I understand it, the mere labor of producing it can be paid for by that sum, in his judgment.

ON PLOUGHING IN CROPS FOR MANURE.

From the Third Report of the Agriculture of Massachusetts.

Boston, March 25, 1840.

Dr. S. L. Dana,—Dear Sir,—Two successful and experienced farmers, one in Franklin and one in Berkshire county, have come to the conclusion that, in turning in crops by way of enriching the land, more benefit is derived, that is, the fertility of the land is more advanced by ploughing in a crop after it has become dried or dead, than by turning it in in its greatest luxuriance and greenness. One of them showed me the results of an experiment tending to this point, which appeared strongly to favor his conclusions. A well-established fact is better than the most elaborate hypothesis; and prejudices, however strong, must yield to facts.

Allow me under these circumstances, to inquire whether, upon your principles or philosophy of vegetation, there occur to you any good reasons for a result so much at variance with popular opinion. Your views in full on this subject, will add to the obligations under which you have already laid the public and your respectful friend and servant, HENRY COLMAN.

Lowell, March 28, 1840.

Dear Sir,—The results referred to in your letter are opposed to the common opinion. Common opinion, especially in agriculture, is not always founded on observation. It is oftener prejudice, than opinion; and, when inconsistent with well known facts, has not its source in observation or experiment. The whole resolves itself into this, *dry plants give more geine than green.* This follows from the little we know of the process termed "fermentation;" I use the term as commonly expressive of the spontaneous decay of vegetables. It includes the three stages of vinous, acid, and putrefactive fermentation. These are not necessarily dependent, following in regular progression. They are not cause and effect. Putrefaction may commence first, and it is so different from the other two, in all its stages and products, that the term "fermentation" ought never to have been applied to it. The greater part of vegetables are susceptible of putrefaction only, a small number become acid at once, and a still smaller number ever undergo vinous, acetous, and putrefactive fermentation. Fermentation then, in its widest sense, will help us to understand how dry crops may be better manures than green. Let us glance at the principles and products of fermentation.

1st. What vegetable substances are susceptible of the vinous fermentation, and what are its products?

The juices only which contain sugar, or starch, convertible first into gum and then into sugar by the action of *azotized* vegetable principles, especially gluten. Pure sugar never ferments. The vinous fermentation must be excited by some substance containing nitrogen. There are three things essential to vinous fermentation, air or oxygen gas, moisture in due proportion, and a temperature never below 50° F., nor above 86° F. The products of this process are gases, ferment or yeast, and vinous liquor. The gases are carbonic acid, and hydrogen. The yeast proceeds from a change in the organization of the gluten and albumen; some late French experimenters think it proceeds from a continued evolution of infusorial plants, hence yeast begets yeast, like sowing crops of seed. However, let us leave speculation. The main facts are as above stated. If, then, we plough in green plants, we put them in a temperature favorable to the commencement of vinous fermentation; we bury them full of sap—the requisite moisture for vinous fermentation;—we cover them, whilst their saccharine principle is in its perfection. Every thing favors vinous fermentation. The sugar and starch of the plant fermented by its gluten and albumen, are converted into gases and alcohol, the former are lost in air, the last washes away or is changed to vinegar. All that remains for the farmer is the altered gluten and albumen, which soon putrefy and form geine. All the starch and sugar of the plant are thus lost.

2d. What vegetable substances are susceptible of the acid fermentation, and what are its products?

The substances are, first, sugar, which in certain cases, becomes acid, without undergoing vinous fermentation; second, gum. The circumstances essential to acid fermentation are air, moisture, and a temperature from 65° to 70° F.; acetic acid is itself the proper ferment of acid fermentation. Vinegar, as is well known, singularly promotes the formation of vinegar in vinous liquors. The products are: carbonic acid, acetic acid or vinegar, and some other acids, especially that called nanceic or zumic acid, which, if not lactic, is perhaps only acetic acid, holding in combination some azotized substance. This acid combines with the alkaline and earthy ingredients of plants and soils, and forms very soluble salts. Green plants, ploughed in, are at once placed in a situation most favorable for undergoing acid fermentation. We suffer a loss of a part of the carbon, and in addition to the sugar and starch, we now lose the gum of the plants. All these are capable of producing geine, and hence in ploughing in green crops, we lose a portion of manure.

3d. What are the vegetable substances susceptible of putrefaction and what are its products?

With the exception of oils, resins, &c., every organized part of every vegetable may putrefy. The circumstances essential to this process, are air, a temperature not below 45°, and moisture. No perfectly dry plant ever putrefies, nor will a moist one, if air is excluded. I have had a capital example of the last, in a piece of a white birch tree, dug up from a depth of twenty-five feet below the surface in Lowell, this winter. It must have been inhumed there probably before the creation

of man, at least at a time "whereof the memory of man runneth not to the contrary," yet this most perishable of all wood is nearly as sound as if cut from the forest last fall. A dried plant has parted with most of its sap, that moisture essential to the commencement of vinous and acetous fermentation. During the very act of decay, from the moment when its living functions have ceased, new combinations of its elements begin. It has already begun to be destroyed by the very agents which gave it life. This is the beginning of putrefaction. Let us not be deceived by a name. Putrefaction we always associate with disgusting effluvia. But in the wide sense we have defined it, it includes also the fragrance of new hay. Whenever bodies consist only of oxygen, hydrogen, carbon, and a trace of azote, their putrefaction is fragant, or inodorous; when, in addition to these, bodies contain large portions of azotized matter, gluten, albumen, or sulphur, and phosphorus, putrefaction evolves abominable odors. To the agriculturist, putrefaction is always a wholesome process, beneficial to his best interests, when promoted and controlled. There is only one case, where this process produces loss. This may be termed *destructive putrefaction*; it is produced by heaping together green plants, or sometimes by moistening dry vegetable substances. Here oxygen is rapidly absorbed, and finally the mass takes fire, and burns. Up to the moment of inflammation this is putrefaction. New hay, stacked too green, is a familiar example. Volumes of steam are evolved, which proceed partly from the decomposition of the plant; decompositions, and recompositions rapidly ensue; these are the ferment, which keeps up the action till the plants burn. Doubtless, all green plants, ploughed in, undergo to a greater or less extent destructive putrefaction, which succeeds the vinous and acid fermentations, perhaps caused by the very rapidity of these processes. Hence, in addition to the sugar, starch, and gum of the plant, we lose a large portion of its other substances, by turning it in green. The products of this rapid fermentation have been but little studied. Happy the farmer who never witnesses the process. He should never induce it, and may generally prevent its extension, when once begun. It is a dead loss to him; but in all other cases of putrefaction, the products are valuable. These vary according as the process takes place: 1st, in air; 2d, at the surface of the ground; or, 3d, deep in the interior of the earth. The last need not detain us—it produces all the varieties of coal.

1st. In the free air, having access to all parts of a plant, putrefaction produces carbonic acid, nitric acid, and water. But ordinarily, in the air, as oxygen does not find ready access to all parts, a portion of the hydrogen of the plant combines then with the carbon, sulphur, phosporus and azote of the plant, and we have carburetted, sulphuretted, and phosphuretted hydrogen, and ammonia produced. Now, as these exist but in small quantity in vegetables, the loss of hydrogen will not be very great by drying the plants, and it is possible, that the removal of these may cause the other elements to enter into more stable combinations, better fitted to produce geine. In all cases of putrefaction in the open air, oxygen is absorbed, and an equal bulk of carbonic acid given out, while, at the same time, the oxygen and hydrogen of the plant escape as water. The result is, that in the substance left, carbon exists in a greater portion, than in an equal weight of fresh vegetables. In all cases of putrefaction, new products are formed; these again resolve into others; and this action goes on till we have no longer any organic products; we have only binary or inorganic substances left. All our researches into the philosophy of the changes in fermentation, terminate in these binary products, that is, in compounds, consisting of only two elements. During all these various changes, a variety of substances must, of course be formed. As the elements of living, so the elements of dead plants, are continually changing into new forms. Nature is admirably simple, and never so learned as our books. We ought not to dignify with a new name, every new product of putrefaction, which we may fortunately arrest. However various these products may be, whether products or educts of putrefaction or of our analytical methods of separating them, all putrefaction at the surface of the earth, ends by forming a brownish, black, powdery mass, which combines with the alkaline, earthy and metallic bases in the plant. This substance has been called "*geine.*" As I have elsewhere defined it, it is the decomposed organic matter of the soil. It is the product of putrefaction; continually subjected to air and moisture, it is finally wholly dissipated in air, leaving only the inorganic bases of the plant, with which it was once combined. Now, whether we consider this as a simple substance, or composed of several others, called crenic, apocrenic, puteanic, ulmic acids, glairin, apotheme, extract, humus, or mould, agriculture ever has, and probably ever will consider it one and the same thing, requiring always similar treatment to produce it; similar treatment to render it soluble when produced; similar treatment to render it an effectual manure. It is the end of all compost heaps to produce soluble geine, no matter how compound our chemistry may teach this substance to be.

Among the many economical modes of producing geine, the ploughing in of vegetable matter, has held a high rank. Nature teaches us to turn in the dried plant. Dried leaves are her favorite morsels, and the very fact, that Nature always takes the dried plant, from which to prepare the food of growing vegetables, should have taught us long ago, the wisdom of ploughing in dry crops. The careful collecting and husbanding of dried leaves, their superior efficacy in forming compost, bears witness to the facts stated in your letter. That the use of dried leaves for compost has not led to the turning in of dry crops, has probably arisen from the consideration, that a greater quantity of geine may be produced, by turning in two or three green crops in a season, than by one crop of dry. This needs experimental confirmation. The very act of tillage, on Mr. Keely's plan, by exposing the insoluble geine of one crop, to air, renders it soluble, while, at the same time, two or three green crops must form a greater quantity of salts. If only one crop can be turned in, let it be dry. All our philosophy, and the late experiments of your agricultural friends, confirm this view.

With great respect, I am very truly, yours,

SAM'L. L. DANA.

REV. H. COLMAN,
Agricultural Commissioner.

CORN SOWN BROADCAST.

From the Southern Cultivator.

In a small enclosure belonging to Mr. D. F. Moore, of Spring Hill, in this county, we noticed what, at first, we supposed to be a beautiful and luxuriant stand of millet. It turned out, however, to be Indian corn, sown broadcast, at the rate of about two bushels per acre, and intended for the scythe while green, and to be fed to milch cows. On inquiry, we were informed by Mr. Moore that this is not now an *experiment* with him, having been tried with the most satisfactory results heretofore. He states that it produces a great quantity of green food, succulent and nutritious, on which his stock feed with delight and thrive rapidly. We should be pleased, however, to see more careful trials repeated with it; doubting, as we do, notwithstanding its great succulence, whether there is indeed much nutrition in the young stalks and blades when cut so early.

WOODLAND RYE.

From the Southern Cultivator.

Five miles from Nashville, on the Franklin turnpike, we saw a woodlot sown in rye, which we are told belongs to Mr. F. McGavock. This lot we learn was quite promising early in the spring, before the leaves of the trees were out. It now, however, evidently suffers with shade; the rye looks watery, jointed and innutritious, and is thinly scattered over the surface of the lot. Such portion of it as matures, will, if suffered to stand, doubtless deposite seed enough to cause a second crop to spring up. In this way many crops may follow, without the cost of sowing or cultivation. Yet we incline to the opinion that *rye in woodland* will after all prove to be of but little profit. In the first place, the seed and rye-crop must, under such circumstances, deteriorate every successive season. Secondly, the seeds of weeds, unless the ground is regularly ploughed every fall, will ripen and multiply, till eventually the rye will be completely choked and destroyed. In the third place, the same woodland, sown down in our native blue-grass (or one of many other cultivated grasses,) would be rendered permanently and doubly more valuable for grazing. whilst it would be kept free from weeds. We hope, however, that Mr. McGavock will carefully note and accurately give to the public the details and result of this experiment, whether they be favorable or otherwise.

LUCERNE.

From the Farmers' Cabinet.

Sir,--As I consider the Farmers' Cabinet the channel through which we first obtained information, in this part of the country, respecting a crop which is likely to make a great stir among us, I think its pages should be devoted to the record of any circumstances which might be found to arise relating to its culture, which, if I mistake not, is about to engross a considerable share of the attention of the agricultural community throughout the union. I must, however, deprecate a Merino-multicaulis-mania in the future prosecution of the matter; let us sit down "doggedly to the task" of examining its real pretensions, and the best modes of introducing it to notice, by proper cultivation on suitable soils and under favorable circumstances, and record the result.

The accounts which appeared some time since in the Cabinet, relative to the crops of lucerne in the island of Jersey, (England,) seemed at the time, to say the least of them, very astonishing; and if they had been supposed to be *quite correct*, must, ere this, have called very general attention to the cultivation of that crop amongst us; unfortunately they came upon us just at the time of the *morus fever*, when we did not suppose that we should ever require any other mode of *making bread*, and people could think of nothing else; and since its disastrous exit, they are inclined to consider such flaming accounts as mere moonshine, and will not, yet a while, consent to be led away by "such another ignis fatuus, such another dance."

I am drawn to this subject at the present moment by reading conflicting testimony, for and against this crop, in the papers of the day, and cannot but think the time is approaching when such very wide differences must be reconciled by practical experiment, and that too by those to whom such employment will be legitimate—by the *real cultivators of the soil*—not men of all other denominations and persuasions, as was the case in the cultivation of the morus multicaulis, and the breeding of Merino sheep. I find, according to the eastern papers, that the cultivation of lucerne has been tried in several places in that country, and has totally failed; while in the Baltimore American Farmer, for the 29th April, there is a particular account of a crop which has as signally succeeded—accounts as opposite as *north* and *south*, and which, possibly, is the main cause of such discrepancy; at the same time, much also must depend on the very opposite nature of the soils in these distant regions; that of the eastern states being about as unsuitable to the growth of tap-rooted plants, extending to the depth of ten or twelve feet into the subsoil, as can possibly be imagined—proverbially rocky, swampy and cold—while on the light and warm soils of Maryland, nothing would seem more suitable than a crop which draws its support, even during the hottest seasons, from a depth far out of the reach of the severest droughts.

Now I must be permitted to profess myself an advocate for the cultivation of this plant in our country; but I do not indulge myself in the idea, that it is suitable for all soils, situations and circumstances. And although I have seen it growing luxuriantly in a small quantity, adjoining the fence of a cottage on the hill, above the sugar refinery of John Brown and Co., at East Boston—and where it might still be found, I have no doubt—and have failed in my attempts to raise it on the warm sands of Jersey, under the most careful treatment; still, that it may be raised in this country with perfect success, in suitable situations, I am as thoroughly convinced as I am of my existence; but I do not think it can be done to any good purpose in the eastern states generally, or on those lands which have moist and poisonous subsoils: these last are destructive to its growth, the deleterious matter being taken up by the tap-

roots of the plants, in the way described at page 18 of the 3d volume of the Cabinet. The spot at which I attempted the cultivation in New Jersey, was at a farm near the Delaware, three miles above Camden, where the owner gave me a piece of his garden for the experiment: the seed came up very quickly, and the progress of the plants was truly astonishing, and until they were about a foot or fourteen inches in height, all appeared as it should be; but my next visit convinced me that there was an end to all my hopes: the under leaves had turned yellow, and the tops of the shoots were sharp and pointed, and showed that they were struck at the root, of which I was convinced on digging them up, for their tap-roots, all of them, were cankered and rotten, and broke easily, even by gentle handling: still these plants, after the decayed roots were removed, would grow and flourish, when planted in a drier spot, for a considerable time, but when their roots had again reached the poisonous subsoil, they would again become prostrated.

My experience in raising this astonishing crop has been pretty extensive, and as I have long been convinced that it is peculiarly suitable to many parts of this country, I would detail a mode in the culture, which, in suitable situations, and under favorable circumstances, would, I am convinced, be attended with perfect success.

The land designed for it should be summer-fallowed, the weeds being carefully gathered after every ploughing, and not a moment should be lost in bringing forward as many crops of seed-weeds as possible, by frequent ploughings and harrowings, turning them down as fast as they come. Before the last ploughing a covering of well-rotted manure should be spread on the land, and this being turned in, the seed, twelve or fourteen pounds per acre, should be sown, broadcast, in August or September, unaccompanied with any crop, and be immediately rolled in. In the middle and southern states there would be no danger of its being injured by the winter cold, provided it be protected by the usual quantity of snow, and although the weeds, which might still remain in the soil, may spring up with the lucerne, yet as they would be prevented from growing in the winter, that crop would shoot earlier in the spring than they, and would soon out-top and overgrow them; while four or five cuttings of the lucerne during the next summer, would prevent these weeds from obtaining even a chance of success.

It is a mistaken idea that lucerne requires a rich soil: this is by no means the fact; indeed I have known several attempts to raise it on such soil, in consequence, I have thought, of this very circumstance—but a *suitable* soil is quite necessary, and what that is, is not sometimes easily definable beforehand; but experiments on a small scale will soon point that out. The *subsoil* for this crop is of much more importance than the *surface*, and the most prolific crops have been obtained from soils supposed too barren to produce any profitable yield whatever. Ashes form an excellent top-dressing for lucerne, as they contain no seeds of weeds, and this is a circumstance of incalculable importance to its future well being: all other manures should be applied during the frosts of winter, for before the seeds of the weeds, which might be contained in them, can vegetate in the spring, the lucerne has started, and will then keep the lead: and when the crop has taken full possession of the soil, nothing appears more tenacious of life, or equal to cope with it, especially during a season of drought, when all other vegetation has disappeared from the face of the earth; then, I have often known it to shoot away at the rate of two inches in height every twenty-four hours. It has been the custom in some places, to raise the crop on a seed-bed, and transplant the roots, but this is changing the nature of the plant, for its peculiar characteristic—a tap-rooted plant—is thus destroyed; and however much it might thereafter flourish on good soils, it is not so fitted to *pump up*, from the depth of twelve or fourteen feet, moisture sufficient to sustain a crop of eleven tons per acre, during the hottest season of the year; nor is it after that, so well able to cope with the weeds, as its strength is never so great as when its roots are deep, and forms a woody crown about three inches in diameter, bidding defiance even to the ploughshare, and seeming to gain strength from the roughest treatment.

Nor is the very general practice of drilling the seed, and keeping the rows clear of weeds by the hoe, at all to be recommended; it is thus made to flourish, but it is at the cost of too much labor and expense; nor have I ever known a hoed crop at all to be compared with very many that I have seen broadcast, and which had been raised with little expense or labor. The observation, at page 258, vol. 3, of the Cabinet, that unless the lucerne crop is sown in drills, and kept clear by hoeing, it will never answer to the farmer, is erroneous—nothing can be farther from the fact—thick sowing in the autumn or late summer, on a clean and suitable soil, will render quite unnecessary drilling and hoeing; and will insure larger crops than can be obtained by any other mode of management.

Lucerne has been denominated an impatient crop, but on soils when suitable, nothing succeeds so well, or with less trouble; the seeds start in a very few days, and the growth of the plants is at first as decided and rapid as the common red clover; but it must be admitted that, after this, it seems ready to give way to a crop of weeds, and the most promising prospect is often destroyed in a few days. But to those who are acquainted with its habits, the cultivation is neither difficult or hazardous; and when it once decides the question "to grow, or not to grow," in the affirmative, there is no crop on earth that can at all keep pace with it; and it is then a crop for life, or thereabouts. The best crops which I ever knew, were those which grew on the sea-shore, not two feet from high water mark—nay, I have known it grow and flourish on the sea-beach, overflown by every spring tide, without suffering the least injury from it. Those crops grew on white sand, with not a particle of earth to be seen in its composition, and there were, of course, no weeds to impede its growth; but, at the depth of several feet, this bed of sand was found resting upon a substance of fine light mould, into which the roots had penetrated, and produced crops which were truly astonishing in their bulk and vigor; and upon these fields it had been customary to tether cows during the whole summer, for ages, without manure, and yet no diminution of its strength was ever dreamed of. During the whole of the winter, not a blade of lucerne was to be seen, the roots had all been

covered by a light coat of sand, which had been blown up from the beach: this protected the crop from the frosts; and very early in the spring, the shoots of lucerne would be found penetrating it in all directions, like asparagus plants, and in a few days they would spread the surface like a carpet, furnishing, in about the space of two weeks, excellent food for cattle of every description, and upon which hogs would fatten, fit for slaughter; it being remarkable that these last, after masticating even the woody stalks of the plant, would not eject any portion of it, but swallow the whole.

In my next, I may resume the subject of the cultivation of this remarkable crop, and in the meantime offer my best wishes for the success of your valuable work. VIR.

May 28th, 1840.

P. S. Any of our friends intending to enter into the cultivation of lucerne, should immediately prepare, by summer-fallowing the land, harrowing after each ploughing, to encourage the weeds to vegetate, destroying them by turning down, and harrowing for a fresh crop immediately.

SILK CULTURE OF THE EARLY PART OF THIS SEASON IN BRUNSWICK COUNTY.

To the Editor of the Farmers' Register.

Lawrenceville, July 3, 1840.

For some years I have been impressed with a strong belief that the raising of silk worms might be made a profitable employment in this state, and that it would give to numerous persons, whose labor now yields little or nothing, the means of comfortable support, if not a competent independence.

After the price of multicaulis trees fell down to almost nothing last fall, and many of my neighbors could not dispose of what they had raised, I determined to make a fair experiment of what could be done in raising a crop of silk worms—I say a crop, by which I mean a summer's or a season's work at that business. Not having trees enough myself, all my neighbors, who did not intend to feed worms themselves, promptly and liberally put their trees at my disposal, so that I had some 30,000 good trees of last year's growth to feed from. Being determined to give the thing a fair trial, I proposed to three ladies of our village, namely, Mrs. Thomas S. Gholson, Mrs. Wm. B. Wilkinson, and my sister, Miss Martha Hicks, if they would, with their house servants, attend to feeding, &c. that I would have an old dwelling house in my yard (24 by 18, two stories high) fitted up for worms, get every thing necessary, and after reimbursing the outlay for the crop, they should have all the profits. The ladies accepted this proposition, and have progressed as I will hereafter tell you. I intended to wait until we had gone through the season, and then to have given you a full detail of all we did, how we succeeded, and how we failed; but as it has been urged upon me that even the little experience we have had might assist some young beginners like ourselves, during the present season, in their praiseworthy efforts to establish this most important branch of industry; and with the hope that it may have that effect, and if nothing better, that it may cheer and encourage some desponding friend of the cause, I have abandoned my original design, and now send you an account of what we have done up to this day.

Last summer I requested Mr. Dwight Huntington, of Mansfield, Connecticut, to look out for the best worms in that place, and from them save me some three or four hundred thousand eggs. Mr. H. is well acquainted with the business, and has been familiar with it for 30 years. He put up 300,000 large sulphur eggs, and 70,000 large sulphur two-crop eggs, remarking, in his letter on the subject, that the two-crop worms were the largest he had ever seen. The eggs were kept by him until the coldest weather of last winter, when he brought them to N. York, and himself put them aboard of a vessel for Petersburg, taking care to stow them in a part of the vessel free from the influence of fire. As soon as the ice permitted, the vessel arrived at Petersburg, and my brother, Mr. L. F. Hicks of your town, lost no time in forwarding them to me. I received them in February, and immediately put them on ice, where they remained until taken out for hatching.

Being all of us entirely unacquainted with the business, except so far as we could be informed from books, we judged it prudent to begin with what we considered a half crop, and put out the two-crop eggs about the 20th April. They began to hatch about the 12th day, and completed their work in about 35 days. My friend, Mr. Huntington, over-estimated the quantity of eggs; instead of being 70,000, there are not more than 45,000. We gathered 13¾ bushels cocoons from these worms. About ten days after exposing the first eggs, we exposed half of the large sulphur eggs, which began to hatch on the 13th day, and taking the medium of the different days' hatching, I will say they all hatched on the 25th May; these are all now spun up, but I have not yet gathered them. We think there are about 100,000 of these, and we hope to get 30 bushels more of cocoons. Following up the plan we had adopted about two weeks after the last eggs were exposed, we put out the residue of the large sulphur eggs, and they began to hatch on the 8th day after exposure; and taking the medium as before, I will say that they hatched on the 21st day of June. They are now moulting the second time, and are about 120,000 in number. If they do as well as the others, we hope to get some 30 bushels of cocoons from them. We have now exposed a full crop of the eggs of the two-crop worms, laid about five or six days ago; and if we do well, shall put out, according to our plan as above stated, another crop of eggs, so as to make five successive crops in the season.

After stating what we have done as succinctly as I can, I will now proceed to make some general observations, which may not be unacceptable to young beginners like myself. In the first place, too much importance, in my humble judgment, cannot be ascribed to the eggs, the purity of the stock from which they come, and the proper keep of them. If either be neglected, nothing can prevent the mischiefs which will instantly result. Of course none who begin this business will be so imprudent as not to have leaves enough for their worms, without stint. If there should be such a one, he must fail. With plenty of food, and good, sound, well-kept eggs, it seems to me that, without casualties which no prudence can obviate, no one ought to fail.

From first to last, through the dampest season

ever known in this country, we have lost no worms from these eggs by disease. We have never fed wet leaves if we could help it; but there have been many days that we have been obliged to do so, or let our worms go without food; no injury was observed from it. I have gone by the directions of Mr. Gideon B. Smith, of Baltimore, whenever I have been at a loss, and have found them always right. My friend and relation, Mr. Thomas Hicks, also, has visited us frequently, and has always given us advice and hints which gave us much assistance.

By the first opportunity I will send you a sample of the cocoons, both of the two-crop and large sulphur variety; 2612 of the former, taken as they came, after being flossed, made a bushel, and are allowed to be the largest ever seen in this county.

I have used no artificial heat whatever; the worms have taken the hot and cold, wet and dry, as GOD sent it. I had the house stripped of every thing to a mere hull, fixing the windows with blinds which I believe are peculiar to this county, and no more trouble to make, and cost no more, than the coarsest shutter. Any house that will keep out the sun and rain will suffice for the healthful accommodation of the worm, always taking care to have it well ventilated.

Of course it will be desirable to know how much labor has been expended in our small establishment. I am sorry I cannot be very precise on this point. My lady partners agreed amongst themselves to take the feeding, day and day about. Each had a woman and small boy about 12 years old, who were amply sufficient for all purposes, except when the worms had to be moved, or thinned, or cleaned off, or fixed to spin, or to gather and cure the cocoons; and in their last stages it required more help to get leaves and feed them. I think I can say, however, with certainty, that for half the time the woman and boy would be ample to do every thing; and for the other half, double that force would be sufficient—the cocoons after being taken down to be handed over to other hands.

I have stated that all the worms from the Connecticut eggs were entirely and completely healthy. But I think it right also to state, that in my absence from home a parcel of worms were placed in the house, which had been presented to the ladies by a gentleman of the neighborhood, which had commenced hatching in his cellar, and of course were hatched out of time and unexpectedly. As soon as I was informed of it, I objected to it and expressed a wish that they should be removed from the house, stating, at the same time, the warning I had received from books and persons against feeding worms hatched either in a cellar or ice-house; but the ladies were too tender hearted to throw away the little creatures, and they were suffered to remain. There were some eight or ten thousand of them, and they were kept in the garret of the house, to themselves. They looked well, and to every appearance were as healthy as any in the house, until they began to spin. Then they began to turn yellow, and to sicken, and to die, and finally not one third of them spun a cocoon, and those which did spin did their work like invalids. In a few days no one could go into the room without feeling ticklish about the stomach: it was a complete failure. Whilst I am on this subject, it will not be improper to state that I have heard of three different instances in this vicinity of worms afflicted with what we call the yellows, being revived by immersion in cold water. (I suppose sprinkling would do as well, but I beg the advocates of these respective creeds not to consider me as taking sides with either.) One happened with Mr. Thomas Hicks, who told me that they spun after they had been immersed. Their being put in water was with no design to cure, but to kill them. A parcel in this place were thrown in the creek, and some boys picked some out, which spun good cocoons. I did not see it, but the persons from whom I got the information are as respectable as any in the country. The other case was, at Clack Robinson's, esq., Robinson's Ferry, Warren county, North Carolina. I had it from Mr. R. himself.

It may be desirable to know what others are doing in Brunswick. I can only say what I have heard, having myself been too much confined to our own, to see much of other people's cocooneries. In every instance where they have used eggs from a bad stock, or of bad keep, they have failed; and in every instance where they have had eggs from a good stock which have been well kept, they have succeeded. I saw Dr. N. W. Lewis yesterday, who told me that his first crop was a failure from bad eggs; but having procured some good eggs for his second crop, he had complete success. Mr. Hugh L. Percevall informs me that he obtained a parcel of eggs from a gentleman in this county, (the one who presented the ladies with the worms above, and some of the same eggs,) in February, and put them on ice; that he hatched them out in May, and they have done well—no sick ones among them; a proof that if these eggs which have been extensively used here, had been put on ice in January or February, instead of being kept in a cellar, that all would have succeeded who used them, for they were from an unquestionably healthy stock. Knowing that this gentleman had a large quantity of eggs from a healthy stock, I took it upon myself once to mention to him the importance of putting them on ice, early. He remarked that he thought his cellar was cold enough, and, I understand, kept them in the cellar; and Mr. Percevall's lot is the only one of which I have heard, which has been successful. John L. Wilkins, jr., esq., informs me that he has had good success, and is feeding largely, and is preparing to feed on a very large scale. He will, no doubt, as well as the others I have named, give to you, and the public, the benefit of his experiments.

I fear I am taking up too much room for one who is so green in this great business. I give you permission to leave out any part which you may think proper, for I have no ambition to appear in print, and have taken no more pains in preparing this than if I had written it for yourself individually.

Before I conclude, however, I beg leave to say to all who are going to embark in this business, that after they have provided a full supply of food, eggs without stint, from a healthy stock, and keep them sound, with industry and attention, they may reasonably expect to do well, and their own experience will be their best instructer. Let no one flatter himself, or herself, that silk is to be made without labor, or attention. Omnipotence has decreed that we must get our living by the sweat of our brow; and we can do nothing in this

or any other pursuit without a copious sweating of the brow.

I think that it would be well to use eggs more liberally; they are the seed of the silk crop, and should be sowed liberally, so that all backward and underling worms might be thrown away; and as mistakes and miscalculations are frequently made as to the quantity our house will hold, we should never have too few to fill it. After a little experience, however, this will be better managed; but to all persons it will happen, if they aim just to hatch as many as they think will fill the house, that they will oftener have too few than too many. Hatch out enough; throwing away is easily done. I would also suggest that it will be best to hatch out what you intend to fill your house at four different times, at intervals of about a week.

When we have completed our labors for the season, if any thing worthy to be communicated shall turn up between now and then, I will send it to you. We saved eggs from four bushels of cocoons of the two-crop worms, which have been all sold before they were laid, at $5 the ounce.

With great respect, yours, &c.,

E. B. Hicks.

[The foregoing report is highly gratifying, and especially as it relates to the labors of the ladies. The few cocoons which were sent as specimens with the communication are very good. We hope that the subsequent operations of the persons now reported of, and all others in Brunswick who have made careful and accurately observed experiments of rearing this season, will be reported by the experimenters, for publication in the Farmers' Register.—Ed.]

EXPLANATIONS.

To the Editor of the Farmers' Register,

June 25th, 1840.

The cold, cloudy, wet weather arrested the growth of my corn, and prevented me from "laying it by," until 23d of June. It is good, but not such as I wished, or expected; but for public use I put it directly upon the great north and south road, that all might see and bear me witness that I speak in truth of the resurrective power of dead land.

My wheat, that far outstripped every thing I had ever owned or seen in this country, is a total failure, not making upon 100 acres 10 bushels. I leave it to the knowing to account for this failure; but I impute it to the long continued rain which aided the lime in preparing more food than the growing plant could dispose of it, consequently ruptured the stalks of wheat from top to bottom, and caused what is called rust. I do not think that one stem escaped in 100 acres. My oats and grass are all I could wish or want. I have been for eight days in bilious fever, and taken so much calomel, that I have nothing in me to spin you a longer thread. My very bad health may make this my last communication: let me, therefore, shake you cordially by the hand. Grass and lime must and will restore our beloved Virginia to full double her virgin production. Fear nothing, for I am within bounds, except where nature has placed the seal of poverty.

Fairfax.

SPINNING PERFORATED COCOONS.

From the Journal of the American Silk Society.

The following letter is from a respectable lady, from whom we some time since received a sample of silk stocking yarn of a very superior quality, made by her from perforated cocoons, and to whom we applied for a detail of the operations by which it was produced. We are sure the letter will be very acceptable to our readers. We shall add but a single remark, and that only to call the reader's attention to the writer's estimate of the labor required to produce silk stocking yarn, compared with that of flax:

York, June 12th, 1840.

Gideon B. Smith:—Thy letter of the 4th was received, and I felt some difficulty in giving a very correct account of the manner the cocoons were prepared for spinning, as they were considered of little or no value, and altogether so carelessly attended to, that we were much surprised that the yarn produced from them was considered worthy of any particular notice; and I would not have thought of sending or showing it to any one; but Joel Fisher, a friend of ours, called on his way to Baltimore, and asked for a skein to take to G. B. S. as he thought it superior to that thee had when in York.

Our having silk worms at all was merely accidental, sent to us by a friend; we knew nothing of their nature; had not even seen one before. But when we had them, depending on us for food, we found it both necessary and pleasant to make ourselves better acquainted with their habits and worth, and collected and read many works on the subject, and soon found ourselves greatly interested in them.

When the cocoons were formed they were taken by a gentleman, an acquaintance of ours, who was much interested in raising silk; but as no reel was to be had in York at that time, he let the worms cut through for the purpose of procuring eggs. In the autumn the cocoons were returned to us, but as we considered pierced cocoons of no value, they were thrown aside. Some time before Christmas they were re-collected, and divided into two parcels, and each put into a bag and boiled.

To sixteen pounds of cocoons, weighed immediately after spinning. I took five quarts of soft soap and as much soft water as was sufficient to cover the bags, and boiled well perhaps four hours; when cool they were hung up to dry, or rather to drain, as I thought wringing or pressing the water out would mat the silk and produce lumps. The next day they were put into water again, with the same quantity of soft soap, which I think is better than hard soap, and boiled again perhaps an hour, when they were well rinsed in clean water and hung up to dry.

When quite dry they were spun on a common flax-wheel, by holding the cocoon in the hand and beginning at the pierced end; the silk comes entirely off, leaving the shell bare.

We took some pains to ascertain whether there were stocking weavers in Baltimore, who would manufacture the yarn for us; but not being able

to hear of any, (though no doubt there are,) I spun the yarn coarse, for the tedious process of knitting. I could easily spin 180 cuts from one pound, and a person accustomed to spinning flax, (which I am not,) a good spinner, would produce 200 cuts with the same ease that 48 are spun from flax; and I think the amount of labor in raising silk is about one-fourth of that of flax. The process of knitting being tedious, we have no stockings to spare, but if yarn sufficient to make a pair will be accepted, thee is entirely welcome to it; and the first conveyance we hear of, we will send it by. We have given to some of our friends, who advocate the silk cause and were willing to accept it, but would rather not sell any.

I feel fully my incapacity for instructing the public in raising or manufacturing silk, and would much rather not have my name in the Silk Journal.

Respectfully, ——.

HAYING. EARLY GATHERING.

From the Boston Cultivator.

Hay that is carted as early as three o'clock, P. M., is kept much sweeter than that which is carted at sunset—the first will become more dry as the heat is retained in it,—we have been surprised at the difference between two loads of wheat, the one carted at three and the other at sunset,—both were equally well cured in the field, but on pitching it over for thrashing, the first was perfectly dry while the straw of the latter was damp and musty. Neither hay nor grain should be carted after the dew has fallen copiously. It is safer to pack them both and take another day.

We have uniformly found it best, after the experience of more than forty years, *to dry our hay in the sun.* We are extremely sorry to be obliged to differ from such high authorities as we have seen on this point; but when occasion calls, we think it a duty to publish boldly our own convictions whether they agree or not with the fancies of others. We are always mortified when we see in any of our farming papers fanciful modes of farming recommended, because they impede the progress of improvement,—they serve to create a general prejudice against looking into a paper for any thing valuable on the subject of farming—and we must honestly ackowledge that the strong prejudice in the minds of many of our yeomanry against what they have denominated "book farming," is not without foundation.

If any farmer wishes to try the new mode of drying hay we hope he will try it on a small scale at first, and for the main body of his hay let him endure the old fashion for one year more of curing it in the sun. Those who dry it in heaps, we would inform him, generally pitch about half a hundred together in the fore part of the same day on which it is mowed—this is turned over towards evening—then again next day once or twice and—*when the weather is fair*—the book says let it remain out four or five days. When the weather is not likely to prove fair some make large heaps of the small ones—some let the small ones stand and take their chance until fair weather comes again.

Our mode of making hay.

We have seen various modes tried, but we have never found any that are better than the following: Mow the grass in the forenoon or towards evening—let it be well spread to the sun—rake it together in the afternoon and put it in cocks if the weather is not promising—or when the harvest is great and the hay is not dry enough to be raked it should be turned green side up before the dew has copiously fallen—on the next day this should all be spread out on the sun, and two days of good weather will generally fit the hay for the barn. When the burthen is quite heavy or when the grass is very green we give it more than two days' sunning—but frequent stirring makes a vast difference in the time necessary to cure hay—the oftener it is moved the sooner it will become dry.

An experienced hand will judge intuitively, almost, when hay is fit for the scaffold—some wring a handful to see if any moisture is left in it—but as a general rule English hay must have two days' sunning, unless we cut it so late that it has become half dry while standing. If we suspect our hay is not quite dry enough, but do not wish to risk it out longer, we may often save it by throwing it on a scaffold or a bay, and not suffer it to be trodden down for a few days—and one peck of salt on a ton often saves us the labor of another day's opening and tending.

If we have but little hay, and wish it cured in the nicest manner, we are careful to put it in cocks while warm and before the dew falls—on the next day we find it has been drying since we packed it up, and, on opening, it presents a fine appearance—but when we have large quantities on hand, we cannot always be so particular—we suffer it to lie in winrow when the weather is good, and thus save the labor of packing and of opening again.

THE CHINCH BUG.

From the Carolina Planter.

Mr. Editor:—Having suffered seriously by the ravages of the chinch bug for the last three years, I have observed its habits, its mode of attack upon corn and small grain, and will endeavor to give you the result of my experience, for the benefit of those planters whose farms are but recently visited by this most destructive insect.

Generally, the bug does little injury in the early part of the spring, being engaged in the business of propagation. They deposite their eggs in large numbers, most frequently under the bottom blade of the corn, and sometimes under the second and third blade. The young insect is very small, and is known by its red color. In a short time after the egg is deposited, the young may be seen by pulling the blade downward, lodged in a compact circle around the stalk—they are very delicate at this stage of their existence, and I was satisfied by an experiment made last summer, that millions of them were killed by stripping the blade off, and exposing them to the sun--a process which is attended by no perceptible injury to the growth of the corn, inasmuch as the bottom blades, being generally more or less injured by the plough, and from their proximity to the roots are of comparatively little use in receiving nourishment from the atmosphere. The most certain mode of destroying the young insects is by the hand—a single gripe, accompanied by a horizontal motion of the hand

being sufficient to destroy the whole depositive. This labor may be performed in the same time that would be employed in thinning the corn; and when the importance of the result is compared with the means used in attaining it, I think no one can doubt, even admitting the time necessary to perform the labor twice as long as that supposed, that "the end will justify the means."

The young insects do the principal mischief, by beginning to suck the juices of the corn where they are deposited—and as their powers of locomotion and their appetites increase, by attacking and finally killing the whole stalk.

Every other mode of destroying this voracious insect that I have known to be resorted to has proved abortive, or "the remedy has been worse than the disease." And after all, the only permanent consolation which I can offer to the suffering planters of your section, is to be found in the migratory habits of the chinch bug. In the particular neighborhood where I plant, they have committed most distressing ravages for the last three years; and this, the fourth year, since their first appearance, they are doing comparatively no injury, whilst the adjoining districts, north and west of us, which have been heretofore exempt, are now suffering greatly.

I have known no remedy to be tried, and have heard none suggested, to prevent the ravages of the chinch bug upon small grain.

J. T.

Edgefield C. H., June 10, 1840.

INDIAN COTTON.

From the Agriculturist.

The American Farmer and Natchez Free Trader bring us some interesting remarks in relation to the prospects of the cotton culture in India. Mr. Boyles, commissioned from the British government, has lately visited Louisiana and Mississippi for the purposes of being initiated into all the secrets of cultivating, gathering, ginning and preparing cotton for market. From the last accounts he had engaged the services of eight young gentlemen of Adams and Jefferson counties, Mississippi, and one from Louisiana, who are all practically acquainted with the different varieties, as well as the modes of cotton culture, to accompany him to Surat, for the purpose of introducing this staple and specie bringing production on a distant shore. They have been engaged at a salary of twelve hundred pounds, and will shortly leave for New York, and thence across the deep to the far east. They take with them nine gin stands, models for gin houses, presses, running gear, and all the fixtures of such establishments. The English, feeling so much interest in this new undertaking, have already appropriated twelve thousand pounds for its encouragement, and evince a determination that the project shall not fail, if money and men can make it successful. Some experiments have been made, with as good success as could have been anticipated, taking into view the sparse information, and of course, slovenly mode of cultivation with the natives. They have worked without cotton gins and the necessary implements for a cotton field, and still the success, in the midst of embarrassments, has been so great that a bold effort is making for its extensive culture. As some proof that the undertaking will be successful, we remark that from all the information we have of the country, the climate is well adapted to the growth of cotton. Though Surat is further south—(being a little over 20 degrees N. latitude,) than our best cotton regions, yet from the trials made, we would suppose as good cotton can be raised there as in latitude 30 degrees of the United States. There is, however, a vast region of country the most fertile of earth between the Ganges and Himmaleh mountains, running northward to Cashmere, that will evidently grow cotton as fine as any place of the world. In China, India and China proper, cotton has long been produced in great perfection, and we see no good reason why a section of country might not be selected on the eastern continent, many times larger than the cotton planting regions of North America, where this staple product might not do as well as on any portion of the earth.

The soils of India have been analyzed and compared with the soils of Louisiana and Mississippi, and found to contain about the same materials, and very much resemble in texture. Another inducement to embark in producing cotton in India is, that the labor of the natives can be had at one fifth, or one fourth at most of what it will cost in Louisiana and Mississippi. Two dollars per month is supposed to be about the average price per hand, but in the cotton districts of America from ten to fifteen dollars per month, is the price of dull "cotton patch" negroes. Still another thing not to be forgotten is, that the *right men* have taken hold of this business. The English have wealth, intelligence, enterprise and the untiring perseverence that generally carries them through triumphantly. After having placed these facts before the American reader, we ask, in the event the English are successful in producing cotton in the east, what effect will it have upon the cotton growing of the south? We answer, it will materially injure it, if not quite destroy it. All, or very nearly all the cotton we export for the consumption of European manufactories, will no longer be needed, for perhaps a better and certainly an article at less cost can be produced in India. True, it may be the interest of Britain to exchange her surplusages, not so much needed or consumed elsewhere for a small portion of our cotton; but the argument that southern planters will ultimately be compelled to turn their attention to other pursuits than that of cotton, is very reasonable. We suggested, as southerners are generally very fond of silk, that they commence the silk business. The climate of Georgia, Alabama, Mississippi and Louisiana, is equal we suppose to any, and we should be pleased to hear of experiments being made through the whole south.

REMARKS ON CALCAREOUS EARTHS AND SOILS.

From the Southern Cabinet.

Mr. Editor,—I observe that Mr. Ruffin has republished in the May number of his Farmers' Register, [p. 301] the article on Calcareous Manures, written by me for your April number. I am sorry that he should consider any part of that article "personal." I wished only to point out, what I considered an "error" in his statement, that the

richest lands in the United States contained little or no "calcareous earth,"—to lament that this, if considered alone, should excite doubts of the important truth that calcareous earth greatly promotes the fertility of soils, if not essentially necessary to such fertility—and to suggest a mode of explaining the apparent inconsistency. If the richest lands in the United States contain no calcareous earth, then such earth is not essential to fertility;—does it really promote fertility in any land?

I believe that Mr. Ruffin is in an error, and that from his not being sufficiently acquainted with chemistry, he had not carried the analysis of these rich lands far enough, or he would probably have discovered in them sulphate of lime (plaster of Paris), or oxalate of lime, or both. Neither of these calcareous earths can be discovered in the usual way of analyzing soils, yet they are believed to be among the most powerful of calcareous manures, and very likely to be formed in our soils by the natural decomposition of some substances, and the subsequent combination of the oxalic and sulphuric acids with lime in these soils. I meant only to explain away a doubt or difficulty, in a way that I had not seen it explained by any one else, and thereby to encourage all who doubted, to go and try the calcareous earths on their lands. We are all liable to errors as well as Mr. Ruffin; it is only surprising that but one error can be suggested against him, and that, evidently the result of his not having gone far enough in the analysis of these rich lands. In this opinion, I myself may be in an error, and some third person may be found, to correct us both in our premature conclusions.

Doubts have been intimated by others, besides Mr. Ruffin, as to the general existence of so large a proportion of magnesia in the calcareous earths of South-Carolina. I will state my mode of procedure, and let others repeat it, either to confirm or disprove the result. Having dried the calcareous matter, I weigh one hundred grains of it in powder and dissolve it in diluted muriatic acid. When the effervescence has subsided, I decant the clear solution and wash the earthy residue so as to separate all that is soluble about it. These washings are added to the clear solution, and the earth dried. I generally guess from its appearance when dry, as to the proportions of clay and sand. I then try the solution with blue paper, and if it contain an excess of acid, I neutralize that with a solution of potash. I then pour into it a solution of oxalic acid, until it is a little in excess, and stir the mixture for a few minutes, to promote the union of this acid with the lime previously united with muriatic acid in solution. The oxalate of lime thus precipitated is washed, dried on filtering paper, and weighed. I generally set down one half of this weight as the proportion of lime found in it. The residue of the solution I precipitate with potash, and obtain the carbonate of magnesia which subsides, and is then washed, filtered, dried and weighed. I may not have mixed a sufficiency of the oxalic acid to precipitate the whole of the lime, and in that way some of it may have been mixed with the magnesia, so as to give too great a proportion of the latter. All the books speak of magnesia as generally found in lime stones, and I have no doubt of the fact in these cases.

The chief cause of misunderstanding between Mr. Ruffin and myself, is, the precarious meaning of the terms used. He prefers the term calcareous earth, thereby meaning carbonate of lime, as I have since learned by reference to his book. I read that book about three years ago, but did not recollect his meaning as there explained. I supposed calcareous earth to mean "lime" in every form and combination in which it is found in the earth. I submit to the candor of your readers, and of Mr. Ruffin, whether I am not excusable for the mistake, as I had not his explanation before me. I bought the first edition of his work three years ago, and did not know until now that there was a second edition. Let me request, through you, that he would send on some of them for sale in Charleston, as there are none to be found in the book-stores or libraries. Jos. JOHNSON.

It is but justice to Dr. Johnson to republish his rejoinder, as above. The admission of error made therein, as to a supposed position of the author of the 'Essay on Calcareous Manures,' is amply sufficient, and he has no desire to contest any other question raised. He never assumed that his reported examinations of soils, to ascertain the contents, or absence, of *carbonate of lime* only, were otherwise than partial, and limited to that one substance; in regard to which, however, he claims to have been accurate. As to his particular application of the term "calcareous earth," as made throughout the essay, he stated at length the difficulty attending it, and still more of every preceding author's different definition or application of that term; and gave his reasons for limiting it to the *carbonate* of lime. (Appendix, p. 72.) And these several applications were not only in the second edition, to which we referred, but in the first also.

In using the expression, "as to matters personal"—we did not mean, as Dr. Johnson supposes, that we deemed them *personally offensive*, but literally and simply as relating to the author personally. In striking the balance between the remarks of Dr. Johnson in approval and in censure of the work, we thought then, as now, that the former preponderated.

We meant not to "intimate doubts," as to the remarkable and general abundance of carbonate of magnesia discovered by Dr. Johnson in the marls of South Carolina. But the fact is so remarkable, and may be fraught with such important consequences in the use of the manure, that it certainly, as we said, "requires attention and full investigation" before admitting its certainty; and that investigation we hope that Dr. Johnson will give. We have seen, and analyzed, a specimen of one bed only of magnesian marl found in Virginia; and that, with all the specimens of marl from South Carolina which we have seen agreed in the one respect, of seeming rather a soft rock of homogeneous texture, and not a mixture of fossil shells and sand like what are called marls

in lower Virginia. We did not suspect the presence of magnesia in the Carolinian marls, and therefore did not test its presence separately from the lime; but we suspect now, from Dr. Johnson's report, that part of the earthy carbonate in these specimens, which we considered and estimated as *lime*, was in fact magnesia.

We have no reason for distrusting the accuracy of Dr. Johnson's process for separating magnesia from lime, not having tried it. But we can refer him, for comparison, to two other modes, used by different operators in analyzing the magnesian marl of Virginia above referred to, and which may be both supposed correct, from the close agreement of results. These are at pages 425 and 462, vol. i. of Farmers' Register, which articles we shall send to him, to aid his investigation of a subject so important to his country.

In answer to the request contained in the last sentence of the foregoing article, we repeat that we never send any publications to booksellers for sale, but will furnish through the mail any that may be desired to be purchased. We shall now send a dozen copies of the 'Essay' to Dr. Johnson, as presents for himself and any of his friends to whom the work may in his opinion be beneficial. —Ed. F. R.

PROFITS OF SHEEP AND OTHER GOOD NOTIONS.

From the Franklin Farmer.

Washington, Aug. 21, 1827.

You ask me how I have succeeded with my sheep? I have never despaired that sheep would, sooner or later, become an object of importance. But the market for wool has been too fluctuating and uncertain to justify going largely into the raising of sheep. I have, heretofore, endeavored by selling, killing off, &c., to keep my flock within moderate bounds. I sheared last spring, two hundred and thirty-six, of all grades from three-fourths to full-blooded—only three or four of the latter—the wool of which, washed on the sheep's back, averaged me thirty-six cents per pound. I have bred for a number of years from common ewes (at the beginning) and full-blooded rams. My sheep last spring averaged 3 pounds and twenty-six hundredths of a pound net wool, per fleece—about half ewes and half weathers—and produced one dollar and seventeen cents per head. Even at this price, sheep are much more profitable than cattle; as, upon the same quantity of land and with less *labor*, you can raise twelve times as many sheep as you can of cattle. Steers at five years old, even stall fed and finely kept, will not average more than twenty dollars, perhaps not so much; but 12 sheep, in *five years*, (if as fine as my flock) will produce seventy dollars and twenty cents, without counting any thing for *the increase* of the flock, or the value of the mutton, tallow, skins, &c. of those killed off. This estimate is founded upon my actual sales last spring. If the increase of the twelve sheep (say six wethers and six ewes) including the value of those killed in *five years*, should be worth twenty-nine dollars and eighty cents (about two dollars and fifty cents annually) the whole proceeds would be one hundred dollars and 20 annually. Now what stock of cattle would be required to produce annually the same amount, if kept solely for the purpose of beef? Say one cow and calf, one yearling, one two year old, one three year old, one four year old, and one five year old, the cattle to be sold off in the fall after five years old. Thus to be enabled to sell annually *one steer* or spayed heifer, you must constantly keep on hand six head of cattle, and this upon the supposition that the cow produces a calf annually, and that no casualties happen. To keep up the stock, however, and to allow for casualties, you cannot calculate upon selling more than *one* for every *seven*, especially as you would have to encounter the risk of spaying the females. To be enabled to sell ten beeves annually at twenty dollars each, amounting to two hundred dollars, you must keep up a stock of at least seventy head of cattle. But sixty ewes and sixty wethers (allowing for the increase as above) will produce you the same sum; or one hundred and seventy-one sheep will produce that amount, without allowing any thing for the increase. But if you could only keep *ten times* as many sheep as you can cattle, upon the *same quantity* of land, and with the same *labor*, then you could as easily keep seven hundred sheep as seventy cattle. Seven hundred sheep (supposing them as fine as mine,) would produce annually eight hundred and nineteen dollars, without allowing any thing for the increase; and allowing the increase, upwards of one thousand dollars, whilst the seventy head of cattle would produce you annually only two hundred dollars. In my judgment, then, sheep are a much better stock than cattle. Indeed, I am clearly of opinion that (except a few for butter and milk, and to feed the rough provender that every farm produces) beef cattle are the most unprofitable stock that can be raised. Indeed, I have found, even to this extent, the raising of cattle is so poor a business, at the present prices of beef, that it is better to let my straw lay and rot, for manure, than to raise cattle to feed it away, because of the quantity of pasture they consume, which might be more profitably fed to other stock. Entertaining these views, you will readily suppose I do not hold *cattle raising* in much estimation.

Wool will bear transportation to a distant market much better than any agricultural production of our state. It is well adapted to *all the states* that do not grow cotton. Were we to manufacture all our cloths, blankets and other woollens, and to exclude foreign wool by a gradual prohibitory duty; there would, in a few years, be an *increased demand*, and consequently an *increased production* of wool to the amount of at least five millions of dollars annually, and the labor bestowed in manufacturing this wool would be a *creation* of wealth to the amount annually of seven or eight millions more, besides the immense advantages that would result to the various mechanics in putting up and repairing buildings, making and repairing machinery, &c. &c., and to the farmers by the *home market*, furnished

for their agricultural productions. Language can hardly convey an adequate idea of the prosperity to which such a state of things would give rise. All this prosperity is within our reach, if we have but the wisdom to avail ourselves of the advantages that offer. Time alone will determine whether we are to become the most prosperous nation on earth, or to continue laboring under the depression and difficulties to which we shall ever be exposed, while we depend upon a foreign nation to manufacture for us the necessaries of comfortable sustenance, while she refuses to buy from us a pound of our flour, beef or pork.

Yours, very respectfully,

A. BEATTY.

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Prospect Hill, Feb. 8th, 1840.

I have no objection to your publishing the letter I addressed to Mr. L. Sanders in August, 1827, if you should deem it expedient to do so. Considerable changes have taken place since that period. The price of cattle, since that time, has considerably increased, I believe almost doubled, whilst wool of the same quality has declined in price. In 1827, *three-fourths* blooded wool sold for 36 cents; last year, I sold my crop in Maysville, (full-blood) to a wool dealer for 40 cents per pound, which, for the grade, is lower than in 1827. My wool would, however, have probably *netted* me 45 cents in Philadelphia, clear of all charges, and that perhaps, may be considered as the price which full-blooded Merino wool will net the Kentucky wool grower, *at this time*, after deducting charges for transportation, commission, &c., which amounts to about three cts. per pound. My fleeces (washed on the sheep's back) averaged about three pounds. Each fleece will, therefore, produce one dollar and thirty-five cents. In consequence of the *uncertainty* of the wool business, arising from our unsteady policy, in relation to the *encouragement and protection of home industry*, I have kept down my flock to about the number I owned at the date of my letter to Mr. Sanders. I have now two hundred and sixty. The wool of these at the above rate, would amonnt to $350. To this sum should be added the value of the annual increase, over and under age is of far greater importance than the above keeping up the flock. I would *estimate* this at only forty-nine dollars. The product of my sheep would, therefore, be four hundred dollars annually.

In comparing sheep husbandry with cattle *raising*, a distinction should be made between the *rearing* of cattle, and *grazing and feeding them*. The grazier buys his cattle at the suitable age for grazing and bringing them into market in one year. If he manages his business judiciously, he will by at such a rate as will make his cattle, when grazed and fatted, pay for the pasture and corn consumed by them, and produce a fair profit upon his investiture of capital, and labor expended in feeding his stock. This is a business that requires a large capital in land, negroes, farming implements, &c., besides a considerable sum in money to buy cattle. It is, doubtless, a good business for the rich interior of our state, as it affords a ready consumption for the rich blue-grass pastures, and abundant corn crops of that region of country, and greatly contributes towards the fertility of the soil. I am not sufficiently conversant with the grazing business to draw a comparison between it and sheep husbandry; and it was not my intention to do so, in the letter I addressed to Mr. Sanders. Nor did I intend to speak of the profits of rearing blooded cattle to sell for breeders. This is a business that must necessarily be confined to a comparatively small number of farmers, and its profits are too uncertain to be susceptible of any very accurate estimate. My letter then must be considered as having reference purely to the *rearing of cattle for beef, milk and butter*.

You will discover from my letter, that I was but little inclined, at its date, to engage in the business of cattle *raising*. I never have suffered my stock of cattle, since that period, to increase beyond twenty-five or thirty. I have aimed to keep them as near the former number as practicable, so as to make them, compared with my sheep, as about one to ten. Thus my cattle stock is annually about as follows: eight milch cows, four each of yearlings, two years old, three years old, four years old, and one bull. This makes 25. As four of these are killed or sold in the fall after they are four years old, their places are supplied by four spring calves, by which the number is kept up. The balance of my calves are either vealed, or sold at weaning time. Thus my cattle stock, (if sold when grass fed, the fall after four years old) will produce me, (sold to our neighboring brethren) about one hundred dollars. If I add for the four supernumerary calves twenty dollars, I then have one hundred and twenty dollars for the produce of my cattle annually; supposing no deaths by casualties. A deduction of twenty dollars on that score would perhaps not be too much, which would leave only one hundred dollars for profit. To this, however, must be added the value of the milk and butter, from the eight cows, the value of which I cannot well estimate in money. If we add one hundred dollars more on that account we shall have, as the entire product of my cattle stock, two hundred dollars, just half the annual value of my sheep. Now as to the comparative cost of keeping the two descriptions of stock, I have no hesitation in saying, that the cost and trouble of keeping my two hundred and sixty sheep is less than that of my twenty-five head of cattle. The sheep require no corn; and except when the ground is covered with snow, will subsist better upon grass and rye pasture than any thing you can give them; and require no labor of feeding, except for the very small portion of the winter that the ground is covered with snow. When that is the case they require a little hay or corn fodder. It is necessary, however, that they should have a good range of blue-grass pasture, upon which, though very short, they will do better than upon dry food.

My cattle stock require to be fed between three and four months, and the milch cows must be grain fed at least until we adopt the root culture.

There is one difficulty to be encountered, in sheep husbandry, which I have not yet mentioned. Dogs are occasionally very destructive to our flocks. Perhaps I ought not to consider this a very great disadvantage, as they have *aided* in keeping down my flock to a number that I do not wish to exceed, while there is so much uncertainty as to the period when we shall be deprived altogether of a market for fine wool. I have looked forward to that period, ever since the passage of

the Compromise Act. If our woollen manufactures shall be enabled to withstand the shock they will meet with, when that act goes fully into operation, I shall be most agreeably disappointed. I feared, from the moment of its passage, that they were destined to be completely *prostrated*. I believe that such will be found to be the result, when that act goes fully into effect. When it passed, woollens, you will recollect, paid a duty of fifty per cent. The reduction of duty commenced, I think, (I speak from memory) in June 1837, and was only three per cent. per annum (that is one tenth of the excess above twenty per cent.) for the years 1837, 1838, 1839, and 1840, making the whole reduction for the four years twelve per cent. But in 1841 and 1842 the reduction will be six tenths of the excess, thereby bringing down the duty very suddenly from 38 per cent. to 20 per cent. When this period arrives, *only a small effort of English woollen manufacturers* will be necessary to break down our own woollen establishments completely, and then *they* will have full command of the market for woollen fabrics in the United States, which will greatly more than indemnify them for any temporary sacrifices, they may have made to put down their American rivals. We shall then have the *glorious privilege* of relying altogether upon *foreigners* to grow wool for us, and to fabricate our blankets, cloths and other woollen goods. We shall too, frequently, have the *glorious effect* of importations, largely exceeding our exports, which we are now *so deliciously* enjoying. To be serious, our "free system" of convenience, with which we are now so much in love, is to break down nearly all our domestic establishments, (perhaps coarse cottons may survive.) Even our navigation, after having grown into an importance, next to that of England, is destined to go with every other interest. The West India trade was wrested from us, by superior British diplomacy, aided by the folly of a political party, who desired to make political capital, by bartering away our navigation rights. Next our navigation interest must go.

Behold the results of our system, in a table annexed to the speech of Mr. Davis, of the senate, on the sub-Treasury bill. In 1821, the tonnage of British vessels, entering *our ports*, was 55,188. In 1835, it had increased to 529,922. The increase between these periods was *eight hundred and sixty per cent.* The increase of *our tonnage*, during the same period, was *seventy-seven per cent.* Thus, in fifteen years, British shipping increased more than *eleven times* as fast as ours. In 1821, British shipping entering our ports, was to ours about as *one* to *fourteen*. In 1835, nearly as *one* to *two and a half*. In a few years more we shall have the glory of seeing more British than American ships arriving in our ports. And if we are to continue our glorious system of admitting foreigners to enter into free competition with us in every thing, it will not be long before our noble tars will be compelled to abandon the ocean, and betake themselves to the land for a support, instead of having "their home upon the deep." It would be in vain to attempt to reason upon the subject of the tariff, in the present state of the public mind. The opinions of a single individual have had such a powerful influence, as to overturn the most settled convictions of a whole community; and nothing but *time* and *long and severe suffering* can bring back the public mind to a sound and wholesome state, in relation to the *importance* and *absolute necessity* of giving *protection* to our *agriculture*, *manufactures*, *commerce* and *navigation*, the four great pillars of our prosperity. We shall have to endure a long course of suffering before we shall be brought to think *correctly*, and to act *rightly* and *efficiently* upon the important topics you touched upon in your letter, and to which I have replied in a hasty and, I fear, too desultory a manner.

It would be doing injustice to Mr. Clay to quit this subject without saying, that not the slightest censure is intended to be cast upon him for the part he had in relation to the Compromise Act. On the contrary, I believe, that under the circumstances, he could have done nothing better for the manufactories or the country. The question was whether the whole system of protection should at once be overthrown, or such a measure be adopted as the compromise bill. The latter alternative was certainly best, because it gave time for a breathing spell, and to prepare for *the worst*. It afforded time also "for the second thoughts of the people." We shall soon see whether they will use the opportunity to any profitable purpose.

Yours, truly and sincerely, A. BEATTY.

HOEING RUTA BAGA.

From the New Genesee Farmer.

An inexperienced cultivator of the ruta baga may commonly be known by his leaving the plants about four times as thickly together as they ought to stand. On ground of any tolerable degree of fertility, the distance of one foot at least should be allowed between the roots, except they be in drills three feet asunder, when they may be suffered to stand a little nearer. If sown broadcast, eighteen inches square should be allowed to each root. If the land is rich enough, they will be so much larger in consequence of this increased space, as considerable to increase the amount of the crop, and greatly to diminish the labor of harvesting.

We have observed, on the best soil, well manured previous years, where the crop had been sowed broadcast, and two feet square allotted to each plant, roots weighing from ten to fifteen pounds, and yielding about fifteen hundred bushels an acre.

If the soil be poor, the above remarks will not of course apply, and the roots must be much nearer together, as they cannot be made to grow large, and number must be made to compensate, in a small degree though it be, for a want of magnitude.

SUNFLOWER SEED OIL.

From the New Genesee Farmer.

Messrs. Editors—Wm. Wood, an oil manufacturer here, has make 27 gallons of good oil from 19 bushels of sunflower seed, without hulling, with Williams & Pinder's hydraulic press. He also made 2½ gallons of oil from 2½ bushels of common pumpkin seed.

The above was manufactured in the usual way of managing flax seed, except that the crushed seed was not subject to as much heat in the revolving cylinder, before it was pressed. S. W.

Waterloo, June 15, 1840.

THE STRIPED BUG.

From the New Genesee Farmer.

Every person who cultivates cucumbers and melons must be acquainted with the yellow striped bug. In former years, we depended most on our activity in catching them, chiefly in the cool of the morning and evening; but we have an easier way to manage them. In the hottest weather they are the most active and seemingly the most voracious; and some days ago, when the mercury stood at 80°, aware of this danger, we visited the cucumbers, and found the bugs in great numbers. A sprinkling of quick lime however, scattered them in haste; and we have not seen a dozen since in the whole garden.

But the large brown bug that infests squashes and pumpkins, must be treated differently, and nothing is better than decapitation. †

BEES.

From the Cultivator.

Few insects, or animals, furnish more materials for instruction or reflection than the honey bee; their wonderful instincts, their labors, their social regulations, are alike deserving the study and notice of all; and while their labors contribute so much to the comfort of man, they should receive a proportion of his care and attention. The blind Huber was the first to give mankind a history of the bee, its habits and instincts, worthy of the subject; and, although many entomologists have since devoted much time to this matter, it is surprising how few facts they have added to those accumulated by the patient and persevering labors of the blind observer. In the management of this domesticated insect, in the best mode of availing ourselves of its stores without taking its life, and in the protection of it from its numerous enemies, some advances have been made, and to no individual are the public more indebted on this score, than to Mr. Weeks, of Vermont, whose Manual on the management of the bee, is deserving of great praise for the intimate acquaintance shown with the subject on which he treats, and the great amount of practical information he has condensed into a very small compass. It is a book that should be in the possession of every bee owner, as they can scarcely fail of receiving much valuable instruction from its pages, even should they not be in possession of the hive he has invented, which experience shows to be admirably adapted to aiding in the management of the bee, and to which, as a matter of course, many of his remarks and rules have reference.

There are two methods adopted in keeping bees —one, in either the common or the improved hives, when they multiply by swarming; and the other, when one or more swarms are put into a house or chamber, so large that their labors can be continued for years without swarming. Both methods have their advantages and their disadvantages. Small hives are more liable to be attacked and destroyed by moths, or to be robbed, than very large ones in which there are abundance of bees; but they multiply more rapidly, and starting with a given quantity of bees, will, in a term of years, if safe from accident, produce a greater quantity of honey; at least, some experiments seem to show that is the case; while bees in houses or large hives require less care, as they rarely swarm, and the honey can be taken when wanted without destroying the bee. This objection of destroying the bee, is obviated in Mr. Weeks' hive, as well as in some other of the improved or patented ones.

Every one who keeps bees should have his hives in readiness, before the time of swarming arrives. They should be made of good stuff, well seasoned and jointed, planed and made carefully, so that the moth may find no cracks in which to deposite its eggs, or the young grub to hide. Hives must always be kept clean and sweet, and if so, a hive that has been used, is as good as one in which no bees have ever been. The hive should be ready for the swarm, as, if one is not offered them soon after coming out and alighting, an embassy is sent out to find one, and the result is, the swarm is lost.

It is still the custom with many, while the bees are swarming, and before they alight, to make all sorts of noises, with horns, tin-pans, bells, &c.; but this is wholly useless, and only serves to irritate the bees. When, after once lighting, they have again risen to go away, we have seen a few pails of water, thrown among them, appear to produce a good effect, caused probably by the wetting of the queen bee's wings, and compelling her to retreat from the apparent shower. In most cases, however, when the bees show a disposition to go off, they will generally do it sooner or later. We have known them to leave a good, new hive for the woods, after they had formed several considerable pieces of comb, and been apparently contentedly at work for thirty hours. There is usually very little danger in taking care of bees while swarming, as the workers invariably leave loaded with wax and honey for the preparation of their new home, and are consequently little disposed to be pugnacious.

Many apiarians are very careful to regulate the size of their swarms of bees, by putting two or more small, weak swarms into one hive, especially when such come out late in the season. Mr. Weeks says—

"Second swarms are generally about half as large as the first, and the third swarms half as large as the second ones. Now, if second swarms are doubled, so as to make them equal in numbers with the first, the owner avails himself of the advantage of a strong colony, which will not be likely to be disheartened for the want of numbers, nor overcome by robbers from stronger colonies."

He might have added, that by more fully covering the combs, these are better protected from the moths where the bees are numerous, than in weak swarms. In regard to doubling swarms, Mr. Weeks adds—

"The operation should be performed within two or three days, [after swarming,] at the farthest four days. The sooner it is done the better and the less hazardous the experiment. As a general rule, second swarms only should be doubled. Third and fourth swarms should have their queens taken from them, and the bees returned to the parent stock.

The most formidable enemy the bee owner has to encounter, is found in the bee moth; and these if they once obtain a lodgment in the hive, and

deposite their eggs in safety, in the comb, or in the glutinous matter with which the bees line their hives, they are expelled with difficulty, and the destruction of the bees is the common result. The egg of the moth or miller produces a small grub or worm, which burrows in the comb, or lining of the hive, for a time, or secretes itself in crevices of the hive, so that the bees cannot get at them, to remove them or destroy them in the hive. As the grub increases in size, it spins a cocoon or web, which it enlarges as it proceeds in the work of eating the honey and comb, and which protects it from the attacks of the bees. Where there are many bees in a hive, the miller finds it difficult to make a lodgment, and if the eggs are deposited, it is hardly possible for the young grub to escape their vigilance; but a weak hive, will, in such a case, scarcely fail of being lost to the owner. A great variety of methods have been practised and recommended, to prevent the attacks of the moth. It was at one time supposed that hives placed in the chambers of elevated buildings, would be above their reach; but some instances have occurred in which hives in the garrets of three story stores have been destroyed; and besides, every bee hunter knows it is not uncommon to find the moth or the grub in the most elevated trees in which the bee is found. Dr. Thatcher, a few years since, announced as an infallible preventive, placing the hive in the bee house, on a layer of sweet clean mould or sand, as the miller would not deposite its eggs in such a position. Mr. Weeks, however, as well as others, found that where the moth was numerous, this method afforded no security, as, after standing a few days, the earth under the hive was found full of grubs, which found in it a safe retreat from the bee. As it is found that the moth usually deposites its eggs under the margin of the hive, it is also found that placing the hive on small square blocks at each corner, so as to raise it half an inch from the board, and thus enable the bees to keep the exposed portion clean, is one of the best preventives known. Frequently sprinkling a little fine salt under the margin of the hive, renders the place untenable to the grub, and is not displeasing to the bees. A gentleman of our acquaintance, who has been very successful in his management of bees, uses a preparation of spirits of turpentine, oil of spike, &c. to keep the moth from the hive. These substances are mixed, put in a saucer, over which a piece of muslin is securely tied, to prevent the bees from getting into it; and this is placed under the hive during the time that the moths are the most active, He assures us he has not lost a swarm from the moths, during the time he has used this preparation. We believe those who have adopted the Vermont hive, have found little inconvenience from the moth, and think it probable, that, with such a hive, and frequent examination, (which is indeed necessary with any hive,) bees may, in most cases, be preserved in safety.

When bees are kept in improved hives, or in a common house or chamber, the honey may be removed at pleasure, without interfering with their labors, or causing that irritation which, if repeated, will render bees cross and dangerous. Much more honey will be made in a hive, from which it can be removed when filled, than in an ordinary hive, as the instinct of bees impels them to desist from labor, only where there is no space to store its fruits. When a hive is filled, they only provide their daily supply; if part of the honey is removed labor is immediately recommenced to replace the quantity abstracted. But, unless there is an abundant supply for the wintering of the bees, none should be taken from the hive late in the season, as starvation and the loss of the whole stock may be the result.

It is sometimes necessary, in unfavorable seasons, or when swarms are late, to feed them to prevent the death of the bees, and the experience of many apiarians would go to prove, that the most proper time for this is during the warm days that occur in the fall, before the commencement of continued cold weather. If the weight of the hive and bees is known, and both should always be ascertained, there is no difficulty, when the season of making honey is closed, in determining, by again weighing, the quantity of honey made, and consequently whether feeding will be required. In feeding, honey in the comb, or strained honey, may be used; but if the last, a thin board pierced with numerous holes, must be laid on the surface of the honey, through which they can obtain the food, or many will get in the honey, and be lost. Unless bees are nearly destitute of honey, it is bad policy to feed them in the spring, as they fill up the combs that should be occupied by the young bees. From twenty to twenty-five pounds of honey will be required, to carry a swarm of bees from November to the middle of April, or the time when they can recruit their stores. Where honey cannot be had, sugar dissolved, or molasses, may be substituted; but honey is always to be preferred where it can be obtained, as all other kinds of food are more or less apt to induce disease.

There is a very great difference in the qualities of honey made in different places, owing to the nature of the flowers from which it is principally extracted. The honey of a considerable district on the southeast shore of the Black Sea in Asia Minor, is noted for its intoxicating or rather maddening qualities, when new; qualities supposed to be owing to a species of hypericum, which abounds in that region. Bees always extract more or less of the peculiar matter of plants with the honey, and hence new honey is more liable in all cases to induce disease, than that which is old. It is the opinion of many that honey is always pure, no matter from what source it is derived; but this is altogether a mistake. Mr. Weeks says—

"Bees never make honey, but extract it from such flowers, and other substances as yield it, without producing any change from its original state. Good honey is principally taken from white clover, orchards, sugar maple, bass or linden, and other forest trees, while in blossom. Poor honey is extracted from buckwheat, and low land flowers; hence, those who would save their good honey unadulterated by that which is poor, will remove it before the latter can be extracted.

Various modes have been tried of wintering bees; all of which, perhaps, have been more or less successful. The dangers to be guarded against are principally those of starvation, extreme or long continued cold, and too much moisture or dampness. The first can be prevented by proper attention to late or early feeding. Death from freezing more rarely occurs, but almost every apiarian, in high northern latitudes, must have lost bees from this cause. Extreme cold also produces death from

suffocation; by freezing the breath or vapor of the bees, and so effectually closing all the openings of the hive by ice, that the air becomes incapable of supporting respiration, and death is the inevitable result. Where too much moisture exists, the combs become mouldy, and the bees become diseased and unhealthy, and frequently perish. If cold weather continues for any great length of time, the hives should be examined, and if the bees are likely to die, they must be at once removed to a room of a moderate temperature, and where the animal heat can be gradually restored. Some apiarians are in the habit of burying their bees late in the fall, and allowing them to remain in that condition until the spring is so far advanced, that they can gather honey from the early flowers for themselves. Their argument is, that, as bees during their torpid or inactive state do not consume honey, by prolonging this state, the danger of starvation is avoided, death from freezing cannot take place, and if the earth is dry, the combs will not mould so as to produce injury. Mr. Weeks says—

"A cellar made in the side of a dry hill, so covered as to keep out water, is a good storage for wintering bees. There should be two ventilators at the two most extreme parts of the cellar—one near the bottom and on its side to admit pure air—the other through the top or covering to allow the bad air to escape."

Want of air is the most frequent cause of death to bees, and this danger of suffocation requires to be more carefully guarded against than any other. Dryness is indispensable to health; and it should always be remembered, that any extra care which bees may receive, which is necessary to their safety or comfort, is usually amply repaid by the additional quantity and quality of the honey produced.

FORMATION OF THE LAGOON ISLANDS.

From the London Quarterly Review—Voyages of the Adventure and Beagle.

Almost every voyager has been struck with astonishment at the lagoon islands—rings of land rising out of the depths of great oceans, and of which a good idea may be formed from the characteristic sketch of Whitsunday Island in Beechey's voyage. These are admirably described by Mr. Darwin.

"The annular reef of this lagoon island [Keeling] is surmounted in the greater part of its length by linear islets. On the northern side there is an opening, through which vessels reach the anchorage. On entering the scene was very curious and rather pretty: its beauty, however, being solely dependent on the brilliancy of the surrounding colors. The shallow, still and clear water of the lagoon, resting in its greater part on white sand, is, when illuminated by a vertical sun, of a most vivid green. This brilliant expanse, several miles in width, is on all sides divided, either from the dark heaving water of the ocean by a line of snow-white breakers, or from the blue vault of heaven by the strips of land, crowned at an equal height by the tops of the cocoa-nut trees. As a white cloud here and there affords a pleasing contrast with the azure sky, so in the lagoon dark bands of living coral appear through the emerald green water.

"The next morning after anchoring, I went on shore on Direction Island. The strip of dry land is only a few hundred yards wide; on the lagoon side we have a white calcareous beach, the radiation from which in such a climate is very oppressive; and on the outer coast, a solid broad flat of coral rock, which serves to break the violence of the open sea. Excepting near the lagoon, where there is some sand, the land is entirely composed of rounded fragments of coral. In such a loose, dry, stony soil, the climate of the intertropical regions alone could produce a vigorous vegetation. On some of the smaller islets, nothing could be more elegant than the manner in which the young and full-grown cocoa-nut trees, without destroying each other's symmetry, were mingled into one wood. A beach of glittering white sand formed a border to these fairy spots.

"I will now give a sketch of the natural history of these islands, which, from its very paucity, possesses a peculiar interest. The cocoa-nut, at the first glance, seems to compose the whole wood; there are, however, five or six other kinds. One of these grows to a very large size, but from the extreme softness of its wood, is useless; another affords excellent timber for ship-building. Besides the trees, the number of plants is exceedingly limited, and consists of insignificant weeds. In my collection, which includes, I believe, nearly the perfect Flora, there are twenty species without reckoning a moss, lichen, and fungus. To this number two trees must be added; one of which was not in flower, and the other I only heard of. The latter is a solitary tree of its kind in the whole group, and grows near the beach, where, without doubt, the one seed was thrown up by the waves. I do not include in the above list the sugar-cane, banana, some other vegetables, fruit trees and imported grasses. As these islands consist entirely of coral, and at one time probably existed as a mere water-washed reef, all the productions now living here must have been transported by the waves of the sea. In accordance to this, the Flora has quite the character of a refuge for the destitute: Professor Henslow informs we that, of the twenty species, nineteen belong to different genera, and these again to no less than sixteen orders!"—*Darwin*, pp. 540, 541.

The explanation of the origin of these islands most generally received is, that they are based on the craters of volcanoes. When we reflect, however, on their vast number, their proximity, and their great size (especially in the case of the *Atolls* in the Indian sea, one of which is about eighty miles in length, with an average width of only about twenty,*) we agree with Mr. Darwin, that this view can hardly be considered correct. There is another class of reefs, in some respects even more remarkable than those forming lagoon islands, and which may be termed encircling reefs, such as are mentioned by our author at p. 555. The moat, as it may be called, surrounding the mountainous island Vanikoro, which lifts its head like the castle of some giant of romance, and frowns over the spot where La Peyrouse was shipwrecked, is even more than 300 feet deep, though Mr. Dar-

* One of the Radack islands of Kotzebuë is fifty-two miles long by twenty broad.

win gives the depths as being within those numbers. The great circular coral wall, built by myriads of minute architects, ascends sheer and steep on both sides. "Externally," says Mr. Darwin, "the reef rises from an ocean profoundly deep. The structure is analogous to that of a lagoon, but with an island standing, like a picture in its frame, in the middle."

Of the construction of these encircling reefs, what explanation can be given? No one as far as we are aware, has hitherto attempted it with any thing like success. It is hardly to be supposed that reef-building *polypi* of every different genera should act in concert. Why should the reef spring up at the distance of miles from the shore, and from a depth, whilst we know that reefs—the instances are innumerable—grow attached to the shore?

Mr. Darwin believes that this problem receives a simple explanation, from the fact, that while the land slowly subsides from changes in progress in the subterranean regions, the reefs of living coral continue to grow to the surface. The line of argument which seems to have led him to the conclusion we shall state; but first let us remind those of our readers who may be only partially acquainted with the progress of recent geological inquiry, that proofs of the rise of the land have come in from all quarters of the world. If, then, the globe be not absolutely swelling like the frog in the fable, which no one will grant, there must be tracts which have lately undergone subsidence, or are undergoing it. In ancient times such movements of subsidence have taken place, attested, as every geologist knows, by the vertical trees in the Portland dirt-beds, the alterations of fresh-water and marine deposites, &c. &c.

Mr. Darwin, then, having these facts in his mind, seems to have been led to consider how it comes that enormous areas of deep ocean (p. 558) are studded with low coral islands, and yet that many facts show that reef-building *polypi* do not flourish at greater depths than twenty fathoms at most. What foundation, then, have these coral islands in spaces of many thousand square leagues of a deep, deep ocean? Must we suppose that there are as many submarine mountains as coral islands, all rising within twenty fathoms of the surface of the ocean, and not one above it? Such a supposition will be rejected as monstrous. The only possible alternative then, as it seems to us, is, that "as each point, one after the other according to its altitude, was submerged, the coral grew upwards, and formed the many islets now standing at one level." (p. 558.)

Mr. Darwin next considers whether the peculiar structure of the lagoon islands and encircling reefs occurring in these oceans, which he is forced by the foregoing argument to believe have subsided, receives any explanation from this movement. He says, in substance—let an island fringed with coral reefs very gradually subside, will not the necessary effect of this be, that although the reef may grow upwards and reach the surface, it will not be so with the land, which will gradually be submerged? Then, according to the amount of subsidence so will the width of the channel be between the reef and shore. If the sinking continue, the encircled island, by the gradual submergence of the last and highest peak, will be conververted into a lagoon island. Mr. Darwin then observes (p. 589), that the non-filling up of the interior basin of the lagoon, on the open channel within the encircling reef, is due to those stations being unfavorable (partly owing to the sand and mud drifted about) to the growth of the massive corals. He proceeds to state that a series can be shown from an annular reef, encircing either one or several small islands, to a lagoon island which merely encircles a sheet of water; and he insists that the difference been the various kinds of reefs (p. 556) entirely lies in the absence or presence of neighboring land, and the relative position which the reefs bear to it. Mr. Darwin, therefore, supposes that as a reef fringing an island is converted by subsidence into an encircled one, so a reef fringing the shore of a continent will be converted into a barrier reef (p. 559), like that extraordinary one on the N. E. cost of Australia, separated from the land by a wide arm of the sea; and there the reefs (p. 564) supposed to be produced by the same kind of movement are found in juxtaposition. The reefs of New Caledonia exhibit a step between an encircling and a barrier reef.

Mr. Darwin seems to think that, if this theory be rejected, not only must the origin of lagoon islands encircling a barrier of reefs, and their presence in one part and entire absence in another, remain altogether without explanation—which, considering their vast number and uniformity of structure, would be not a little remarkable;—but that all the facts showing that reef-building *polypi* will not live at great depths must be rejected; for we must then suppose that the reefs have sprung up from submarine mountains, which we cannot grant, over spaces of many thousand square leagues. If, on the other hand, this theory, which includes under one head the origin of the several reefs, he admitted, very important deductions must follow from it; for it shows that great portions of the surface of the globe have recently (in a geological sense) undergone movements of subsidence (which it must always be extremely difficult to detect by any direct evidence); and what is even more worthy of note, it shows that the movements have been so far gradual, that no one sinking down has carried the reef below the small depth from which the *polypi* could rear it to the surface again. So far so good; but Mr. Darwin alludes to even more extended inferences, which we shall not notice, as the subject will soon be treated by him at full length.

ON THE SUPERIOR ADVANTAGES OF GROWING ORCHARD GRASS WITH RED CLOVER.

From the Germantown Telegraph.

Read before the Philadelphia Society for promoting Agriculture, March 4, 1840, by James Mease, M. D., V. President.

My attention was first called to this subject when reading the late Mr. Bardley's 'Notes on Husbandry,' (1799,) in which he states the benefits to be derived from the sowing together the two grasses first mentioned, and his remarks appeared so well founded in reason, that I was disposed to pursue the practice he recommended; but before trying the experiment, I consulted the late Algernon Roberts, of Philadelphia county, one of our best farmers, on the subject, and was pleased to hear him approve of the measure.

My question was, "which was the best grass to grow with red clover?" He answered at once, "orchard grass," by reason of their blossoming at the same time, and the orchard grass giving early and late pasture, which was a great object with him, as he devoted his attention to the supply of butter for the Philadelphia market. Joseph Cooper, of New Jersey, to whom I also applied for an opinion on the same point, was equally prompt in favor of the union of the two grasses in question. Thus backed, I had no hesitation in deviating from the usual routine adopted in Delaware, and still continued very generally throughout Pennsylvania; and upon the first field of wheat which I laid down, viz: in 1805, I had sown the following spring, 12 measured pints of clover seed with one bushel and a half of orchard grass seed previously well mixed.—After the grain was removed, I saw, with very great delight, both grasses thickly covering the ground, and nearly as high as the stubble; and late in the autumn had the satisfaction to see my cows enjoying a luxurious, succulent repast, after the fields which were sown with timothy and clover in the vicinity had ceased to supply it. But this gratification was small when compared with that I experienced the following spring, by beholding the towering orchard grass in full blossom at the same time with its companion, and the ground thickly set with both. Reserving a certain space for maturing the seed of the orchard grass, I had the crop cut when a few only of the clover blossoms were beginning to turn, being then sure of perfect maturity of the rest, and found that they, equally with the leaves, retained their connexion with the stalk much better than when the grass was cut after the clover blossoms had assumed a dark hue. Another advantage attending this early cutting is, that the stalks preserve their pliancy and are eaten freely by cattle; whereas they are wasted when they become hard from the mowing having been done at a late period.

My experience of six years of the union of the two grasses enables me to say that the advantages of sowing orchard grass in preference to timothy, are as follows:

1. Two crops in place of one.
2. Good pasture late in the autumn instead of none.
3. The curing of both grasses in full perfection, while, when timothy is sown, the clover blossoms and leaves are dead, black, and chiefly fall off in the curing of the hay, owing to the ripening of the timothy from 12 to 15 days after the clover. Farmers will never cut their grass until the timothy is fit for the scythe.
4. Early pasture, even before the pestiferous, hateful wild garlic makes its appearance, or at least as early as the latter, and by its rapid growth, smothers or lessens the crop of this enemy to the products of the dairy. The same remarks apply to the autumnal growth of garlic.

Orchard grass is upon a par with timothy, in point of nutritive quality and of animal partiality, and will command nearly as great a price as timothy. Two crops, and the early and late pasture of the orchard grass make up for the small difference in the price of hay from the two grasses.

THE RESULTS OF MARLING IN THE COUNTRY ABOUT WILLIAMSBURG.

If any person yet doubts the value of marl as a means of profitable and durable improvement of land, and therefore hesitates or delays to use this manure, let him visit the country surrounding Williamsburg, and see the marled and the unmarled lands, and learn the circumstances from the proprietors. And if such an inquirer should be one of the young men formerly educated there, and who has not been there for twenty or more years, he will need no verbal information to assure him of the remarkable improvement made, nor any arithmetical statements to convince him of great increase of fertility and of wealth. We do not know whether any doubters or deniers of the value of marling yet remain in lower Virginia; but there are many such in the more southern states; and it would be not only worth the expense of the journey, but perhaps a fortune to boot, for any such persons, having the means of marling, to come here and learn what profits others have made by this most valuable of all the means for fertilization.

Twenty years ago, the general condition of agriculture of the counties of York and James City, was among the lowest in Virginia. The lands, excepting some of the rich river margins, (which *Nature had marled*, and which man had been laboring in vain to exhaust,) were generally poor, and the profits of cultivation very low. The prices of lands, both the rich and the poor, were astonishingly low, even after making every allowance for their wretched cultivation and products. Some of the poor lands, but with plenty of marl, and easily and cheaply improveable, and within a few miles of ship navigation, sold for about $1 the acre; and $3 was deemed a very good price.

Other things were in accordance with the condition of agriculture. There was but one thing that formed an exception. The last survivors of the old aristocracy of the ancient capital of Virginia yet lingered, and their fortunes had not been entirely spent in wasteful hospitality, nor disappeared by division and subdivision. And to this cause it was owing that the society of the generally decayed and partly ruinous village of Williamsburg was more refined, and social intercourse more delightful, than in cities exhibiting the very different indications of general prosperity and great individual wealth. But with this exception, which was yearly becoming more faint, and has since almost disappeared, every thing in Williamsburg then was the accompaniment of decay, or an indication of approaching ruin.

The College of William and Mary, however, up to 1812, had been what was then deemed prospe-

rous, even considering it, as it was then and previously, the most important and almost sole institution of learning of high order of all Virginia, and which received students also, every year, from every southern and south-western state of the confederacy. From 60 to 70 students in the scientific and law classes served for this state of prosperity. It was rare for a student to be sent from the adjacent counties, and then only from houses whose fortunes were declining, and never from one where recent industry had served to produce wealth. The people generally were poor and ignorant, and too ignorant to prize education for their sons, even when abundantly able to pay its price. The money brought by the students of the college was almost entirely a foreign supply, and served as an important aid to the support of the village, and its adjacent country. Even this aid was lost, when, for causes not necessary to be here stated, the college afterwards declined so much as to have less than 20 students a year.

But when every thing else was at the lowest state of depression, marling had been commenced some years before by a few proprietors, and the improvement was slowly, but at a yearly increasing rate of progress, advancing over the neighboring country, which was eminently suited to be so improved, in consequence of the natural character of the soil, as well as because of the good quality of, and easy access to the marl beds. In a few years almost every proprietor was marling, to some extent; and most persons near Williamsburg have now marled the greater part, or all, of their cultivated lands.

It is not our purpose here to state the particulars of any improvements and profits made by marling. We hope to receive a report of that description from a gentleman who has promised it, and who is well qualified by experience as an improver, as well as by his other sources of information, to present the marling statistics of his part of the country. It is enough here to state generally what we have recently learned in that neighborhood.

The present fertility of the formerly very poor lands is not only great *relatively*, but *absolutely*. The crops are good, even without reference to, and comparison with, the former miserable products; the change from which appears so wonderful to those who now visit the country for the first time after 20 or 30 years' absence. The crops are from double to quadruple their former rates, and of course the net profits of culture are far more increased. The prices of land have also risen nearly as much as its product, or as its means for improvement offer, even in advance of the actual marling. The formerly poor cultivators have not only improved in wealth, but still more in the manner of using their wealth. They prize education, and are now sending their sons to fill the college, which their fathers made no use of. The same cause is working throughout lower Virginia, though not so perceptibly as here; and, while we give full credit to the reformation and improvement of this institution of learning itself, and highly appreciate the learning and worth of its professors, and the value of its regulations and discipline, we still believe that to *marling* the College of William and Mary owes much of its progressive increase within seven years, of from only 17 students in 1834 to 140 at the present session.* The professors, and the course of instruction, might have had all their great and acknowledged value; but as vainly as in former times would these advantages have been offered to the people of the adjacent country, if their increase of wealth had not produced among fathers a demand for, and also the means of supplying scientific education for their sons.

Williamsburg, for the greater part, still presents the appearance of a town in decay. For although the prices of lots and houses are tripled, a few years will not suffice to repair such extensive delapidations as had been permitted to take place. But there are sufficient indications now that repair is in fast progress, and resuscitation close at hand. Not only have many of the old and in some cases ruinous buildings been thoroughly repaired, but new and costly houses have been recently erected; and it is manifest that this ancient city (in rank, though but a village in size,) which was beautiful even in decay, and when almost in ruins, before long will exhibit the different kind of beauty of newness and of growing prosperity. The trade of the place has risen to importance, and its merchants are highly respectable and wealthy. And this great change of the state of trade, though now greatly aided by the present prosperity of the college, had commenced, and had proceeded far, while the college was actually sinking.

The support and, we trust, the fruits of religion have been increased as much and as manifestly as other benefits; and we hope not to be charged with being wanting in reverence for religion, when we assert that its service also has been as essentially promoted by *marling*, as we have

* The following statement shows the number of students, and the rate of increase, in the seven last years.

In the session of	1833-4 there were	17 students.
	1834-5	48
	1835-6	67
	1836-7	113
	1837-8	112
	1838-9	132
	1839-40	140

claimed for the increase of fertility, of wealth, education, and general refinement. Until recently, the public worship of the episcopal church was mainly, though indirectly, maintained at the expense of the college. The president of the college, or one of the professors, always was an episcopalian clergyman, and one of such grade of learning or of reputation as could not otherwise have been obtained here; and thus the services of the church were maintained at very small additional expense to the inhabitants. The most venerable old church in Virginia, and an excellent and costly building, they inherited from the old establishment. The other denominations of Christians were much worse off, and their public religious services on the most humble footing. Now all are greatly advanced, and are still advancing. The former connexion between the college and the church has been effectually severed, we trust for the good of both parties; but certainly and greatly to the benefit of the college. The members of the episcopal congregation now pay for, and entirely support their own church and its service, and that too with a degree of liberality, and to an amount of expenditure, which are remarkable for so scanty a population. The most costly, and what is deemed the greatest improvement thus made, the thorough alteration and repair of the interior of the old church, we could well have spared, and indeed cannot but regret the change. Compared to the old fashion of the church, with its spacious area, and its long and gloomy aisles, floored with stone and interspersed with old monumental inscriptions, and the general simplicity, and absence of decoration, the present interior has the elegance and luxury of a modern drawing room. But the unquestionable beauty and comforts of the newly modelled interior do not adequately compensate for the loss of the severe and simple grandeur of the old structure. More than $3000 have been recently expended to repair and *dandify* the church, and at the sacrifice of half its space, and the destruction of every appearance of what was antique, solemn, and venerable. Fortunately, the exterior of the building could not be damaged by modern improvement and decoration; and therefore the church retains its ancient form, and is now, as always to *our* taste and feelings, more admirable and impressive in its simple and even rude style of architecture, than the most costly and highly adorned of modern churches.

The present prosperous and excellent condition of the College of William and Mary will be the most highly appreciated by those who are most intimately acquainted with the existing facts; and will be deemed most remarkable by those who best knew it formerly, in what was then deemed its time of greatest prosperity. Then, when without a rival in Virginia, or scarcely in the south, about 70 students was the highest average number; and no one then questioned or doubted the received opinion, that the institution was highly prosperous, and in entirely successful operation. Afterwards various causes concurred to depress the institution, and to bring it to the brink of ruin. After nearly 20 years of fluctuation and adversity, and of general decline, as late as 1834 there were but 17 students. Then commenced the fortunate change; and a very regular and rapid increase has brought the number this year to 140 students in the law and scientific classes, or to double the number of the greatest average of old times. Yet now William and Mary is so surrounded and pressed upon by rival and successful and growing institutions, that all that can be now deemed its proper province is the tide-water region of Virginia; and even of that, very many of the young men are sent by their mistaken parents to northern colleges of far less worth than now may be justly claimed for William and Mary, both in regard to the ability of its professors and the excellence of the course of instruction. A course so mistaken, and so opposed to patriotism, as well as to the private interests and welfare of the individuals so acting, cannot long continue; and we predict that, even if no more extended ground should be occupied by this college, the tide-water and marl region of Virginia alone will still more swell the number of its pupils. But, in fact, its present field of operations is much more extensive; and more than half its students still come from the upper country.

But to return from this digression. Any stranger to this part of the country, who may read and believe these or other published statements of the improvements here made by marling, would naturally infer that the whole marl region of Virginia was pursuing the like profitable course. But such is not the case. It is true that nobody now denies the value of marl, and the profit of applying it as manure. But still, so slow is the progress of the most valuable and undoubted improvements upon old practices, that often years are required for a new practice to extend a few miles. Wherever some one intelligent and energetic farmer in lower Virginia has gone to marling on a large scale, his example has gradually spread to all the farms around him. But without such an intelligent and spirited pioneer, to exhibit *to the eyes* of his neighbors the benefits and profits of the practice, the experiments are small and few, and but little is done for general or extensive operations. The neighborhood of Williamsburg, and extending to more than 12 miles above, is one of the

most generally marled and thereby best improved districts of Virginia. Yet but a few miles outside of this gradually widening circle, marling is comparatively neglected, and some proprietors have even done nothing as yet to obtain the profits from it, which they might command as cheaply as any other persons. But though the progress of this mode of improvement, like every other in our benighted agricultural condition, is slow, compared to what it should be, still it is steadily gaining ground, and never loses ground or favor where once commenced. It may be long before the completion—but we nevertheless have undiminished confidence in our prediction often heretofore made, that, by means of marling, the tide-water region of Virginia is destined to become the most valuable agricultural region of the state, and one having agricultural advantages inferior to but few regions in the world.—Ed. F. R.

UNIVERSITY OF VIRGINIA.

List of Graduates of July 4th, 1840.

Degrees were conferred by the chairman of the Faculty on the following students, who had been admitted by the Faculty to graduate in the schools mentioned:

School of Ancient Languages.

Charles H. Barksdale, Charlotte, Va.
John Stage Davis, University of Va.
John N. Hendren, Augusta Co., Va.
Carter Page Johnson, Richmond, "
Francis R. Rives, Albemarle Co., "
C. R. G. Slaughter, Charlottesville.
James D. Thornton, Cumberland, Va.

Latin Language and Literature.

George W. Abell, Albemarle Co., Va.
James H. Brame, Mecklenburg, "
John S. Caskie, Richmond City.
V. Saunders Paul, Louisa Co., Va.
John Prosser Tabb, Gloucester, "
S. Dandridge Tucker, Richmond, Va.
Albert P. Whitehead, Alabama.

School of Modern Languages.

Charles H. Barksdale, Spanish and Anglo-Saxon, Charlotte Co., Va.
John L. Burruss, French and German, Louisa Co., Va.
Lucius J. Dupre, French and Spanish, Louisiana.
James D. Thornton, French and Spanish, Cumberland Co., Va.

French Language and Literature.

Colin B. Buckner, Lynchburg, Va.
John S. Caskie, Richmond.
Benjamin E. Green, Baltimore, Md.
Thomas F. Perkins, Buckingham, Va.
Joseph A. Shanklin, South Carolina.
C. R. G. Slaughter, Charlottesville.
S. Dandridge Tucker, Richmond, Va.

Italian Language and Literature.

Henry Stokes, Lunenburg Co., Va.

Spanish Language and Literature.

W. C. Carrington, Charlotte Co., Va.
Henry C. Lay, Richmond City, Va.
Albert P. Whitehead, Alabama.

Anglo-Saxon Language and Literature.

John S. Barbour, jr., Culpeper, Va.
John Prosser Tabb, Gloucester, "

School of Mathematics.

George W. Abell, Albemarle Co., Va.
Robert L. Brown, Nelson, "
John W. Clay, Huntsville, Ala.
Lewis W. Cabell, Buckingham Co.
John P. DuVal, Florida.
William L. Early, Madison Co., Va.
Hunter H. Marshall, Charlotte, "
Lewis Turner, Louisa Co., "
S. Dandridge Tucker, Richmond, "
John Randolph Tucker, " "
Thomas H. Watts, Ala.

School of Natural Philosophy.

George W. Abell, Albemarle Co., Va.
Benjamin J. Barbour, Orange " "
Charles H. Barksdale, Charlotte "
Henry Coalter Cabell, Richmond, "
John S. Caskie, " "
Wm. C. Carrington, Charlotte, "
John Stage Davis, University of Va.
Wm. P. DuVal, Florida.
Robert L. Dabney, Louisa, Va.
Carter Page Johnson, Richmond, Va.
Warwick N. Miller, Kentucky.
Francis R. Rives, Albemarle, Va.
Joseph A. Shanklin, South Carolina.
Lewis Turner, Louisa Co., Va.
John H. Timberlake, Charlottesville.
Isaac R. Watkins, Charlotte Co., Va.

School of Civil Engineering.

Wm. P. DuVal, Florida.
John C. DuVal, "
Robert B. Moon, Albemarle, Va.

School of Chemistry.

John S. Caskie, Richmond City, Va.
Henry Coalter Cabell, Richmond, Va.
John W. Clay, Huntsville, Alabama.
John Stage Davis, University of Va.
Robert L. Dabney, Louisa Co., Va.
C. Temple Emmet, New York.
William H. Jones, Mecklenburg, Va.
James F. Jones, Frederick Co., Va.
Warwick N. Miller, Kentucky.
Marcellus M'Kennie, University of Va.

Carter Page Johnson, Richmond, "
Thomas F. Perkins, Buckingham "
Alex. H. Rogers, Albemarle, "
Gales Seaton, Washington City, D. C.
Joseph A. Shanklin, South Carolina.
C. R. G. Slaughter, Charlottesville.
James D. Thornton, Cumberland, Va.
Thomas Towles, Louisiana.
William Watts, Roanoke Co., Va.
Isaac R. Watkins, Charlotte, "
James L. Woodville, Botetourt, "

School of Medicine.

Eleazar G. Clay, Chesterfield, Va.
William Hamilton, Staunton, "
Patrick Henry, Campbell Co., "
J. Philip Smith, Clarke Co., "
J. Archer Talley, Cumberland, "
Reuben P. Thomas, Buckingham,
William Watts, Roanoke, "
James B. Winston, Culpeper, "

School of Moral Philosophy.

John S. Barbour, jr., Culpeper, Va.
Robert L. Brown, Nelson, "
James H. Brame, Mecklenburg, "
Colin B. Buckner, Lynchburg, "
John Stage Davis, University of Va.
William L. Early, Madison Co., Va.
Wm. H. Jones, Mecklenburg, "
Joel W. Jones, Alabama.
Carter Page Johnson, Richmond, Va.
F. Lewis Marshall, Fauquier, "
James L. Orr, South Carolina.
Thos. F. Perkins, Buckingham, Va.
Francis R. Rives, Albemarle, "
Wm. J. Shelton, Lynchburg, "
Thomas Slaughter, Mississippi
C. R. G. Slaughter, Charlottesville.
Nicholas T. Sorsby, Alabama.
Isaac R. Watkins, Charlotte Co. Va.

School of Law.

John D. Bracey, Alabama.
R. HumeBntcher, Alexandria, D. C.
Henry W. Davis, " "
Wm. S. Goodwyn, Southampton, Va.
F. Lewis Marshall, Fauquier, "
John W. Menzies, Kentucky.
Geo. W. Randolph, Albemarle, Va.
T. Jaquelin Smith, Clarke Co., "
Stephen O. Southall, Amelia Co., Va.
John O. Steger, " " "
Joseph D. Shields, Mississippi.
Jaq. P. Taliaferro, Orange Co., Va.
Geo. W. Truehart, Charlottesville.
Dabney Carr Wirt, Richmond City.

WILLIAM AND MARY COLLEGE.

Public exercises and honors of July 4th, 1840.

1st. An Oration on the effects produced by the introduction of Free Institutions, and the extension of liberal principles: by Edmund W. Jones, L. B. of N. Carolina.

2nd. An Oration on the Right of Instruction: by Wm. Old, L. B. of Powhatan.

3d. An Oration on the Reciprocal Action of Mind and government: by Geo. W. Richardson, A. B. and L. B. of Hanover.

4th. An Oration on the Past and Present Condition of our Country: by William Waller, L. B., of Williamsburg.

5th an Ooration on the Decline and Fall of the Grecian Republics: by Warner T. Jones, A. B. and L. B., of Gloucester.

6th. An Oration on the Present Condition and Future Prospects of the American Union: by M. B. Seawell, L. B., of Gloucester.

7th. An Oration on the Influence of Patriotism, and the Diffusion of Knowledge upon a Republic, and the Progress of the Arts and Sciences within the United States: by Lloyd W. Williams, L. B. of Norfolk.

After an Address from the President to the Students, the Degree of *Master of Arts* was conferred on

Benj. F. Dew of King and Queen,
A. C. Peachy of Williamsburg.

The Degree of *Bachelor of Law* was conferred on

Wm. E. Blankingship of Chesterfield.
Joseph M. Carrington of Richmond,
Wm. E. Clarke of Alabama,
John H. Dillard of N. Carolina,
John Finney of Powhatan,
Alex. Jones of Chesterfield,
Edmund W. Jones of N. Carolina,
James B. Jones of Chesterfield,
Warner T. Jones of Gloucester,
Wm. Old of Powhatan,
James H. Rawlings of Spottsylvania,
George W. Richardson of Hanover,
M. B. Seawell of Gloucester,
William Waller of Williamsburg,
Lloyd W. Williams of Norfolk.

The degree of *Bachelor of Arts* was conferred on

L. W. Carter of Charles City,
Geo. R. Dupuy of Petersburg,
Wm. H. Gwathmey of King William,
Thos. H. Harrison of Sussex,
Warner T. Jones of Gloucester,
David E. Meade of Dinwiddie,
John Minge of Charles City,
Geo. U. Nottingham of Northampton,
James H. Rawlings of Spottsylvania,
George W. Richardson of Hanover,
Wm. H. Sims of Halifax,
Tristram L. Skinner of N. Carolina,
John B. Stanard of Fredericksburg,
Thomas S. Watson of Louisa,
Wm. C. Williams of Richmond

Certificates of Proficiency, in the subjects specified, were conferred on the following gentlemen:

Wm. T. Allen; Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, Jun. Mathematics and Metaphysics.

Wm. H. Anderson: Belles Lettres, Rhetoric, Logic, Ethics, History and Chemistry.

F. M. Baker: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law and Metaphysics.

F. L. Barziza: Chemistry.

Wm. E. Blankingship: Political Economy and Metaphysics.

Norborne Blow: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry and Jun. Mathematics.

Wm. N. Blow: History and Chemistry.

Jas. Boisseau: History and National Law.

Thos. H. Bullock: Political Economy.

Joseph M. Carrington: Belles Lettres, Rhetoric, Logic, Ethics and History.

William E. Clarke: Political Economy and Metaphysics.

James A. Clopton: History.

James W. Cook: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law and Mathematics.

O. A. Crenshaw: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry and National Law.

John H. Dillard: Belles Lettres, Rhetoric, Logic, Ethics and History.

J. F. Dilley: Political Economy.

J. F. Edmunds: Belles Lettres, Rhetoric; Logic, Ethics, Chemistry and National Law.

E. D. Farrar: History.

A. C. Garrett: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, Jun. Mathematics and National Law.

Battaile J. Gouldin: History and Jun. Mathematics.

John S. Hannon: Chemistry.

John Harrison: Chemistry and National Law,

John T. Hatcher: Belles Lettres, Rhetoric, Logic, Ethics, History and Jun. Mathematics.

Leo. Henley: Chemistry.

Daniel C. Holliday: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, Jun. Mathematics and National Law.

Benjamin Irby: Belles Lettres, Rhetoric, Logic, Ethics, National Law, and Nat. Philosophy.

Peyton Meade: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law and Mathematics.

Jesse S. Miller: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law, and Jun. Mathematics.

John E. Moore: Belles Lettres, Rhetoric, Logic, Ethics, National Law, and Chemistry.

George U. Nottingham: History.

John H. Nottingham: Chemistry and National Law.

William Old: Political Economy and Metaphysics.

John B. Peachy: Chemistry, Jun. Mathematics and History.

J. P. Pierce: Belles Lettres, Rhetoric, Logic. Ethics, History, National Law, Chemistry, and Jun. Mathematics.

David W. Pitts: Belles Lettres, Rhetoric, Logic, Ethics and National Law.

William Radford: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law and Political Economy.

James M. Robertson: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law, Chemistry, and Jun. Mathematics.

L. B. Rose: Belles Lettres, Rhetoric, Logic, Ethics and Chemistry.

Thomas F. Scott: Belles Lettres, Rhetoric, Logic. Ethics, Chemistry and National Law.

M. B. Seawell: Political Economy.

Churchill Semple: Political Economy and Metaphysics.

Ed. B. Shelton: Chemistry and Jun. Mathematics.

Reuben Smith: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law, Chemistry, and Jun. Mathematics.

Waddy Street: Chemistry.

William B. Taliaferro: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, and Jun. Mathematics.

John H. Taylor: National Law.

William A. Temple: Belles Lettres, Rhetoric, Logic, Ethics, Chemistry and National Law.

J. S. Trueheart: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law, Chemistry, and Jun. Mathematics.

Wat. H. Tyler: Belles Lettres, Rhetoric, Logic, Ethics, and History.

C. C. P. Waller: National Law.

John D. Warren: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law, and Mathematics.

A. A. Whitehead: History, Chemistry, and National Law.

Lloyd W. Williams: Political Economy and Metaphysics.

Thomas M. Wilson: History.

L. Y. Winder: Belles Lettres, Rhetoric, Logic, and Ethics.

J. T. Wooton: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, and National Law.

ON IMPROVEMENT BY RAIL-ROADS AND CANALS.

Extract from an article in the New York Review for April 1840.

In the meanwhile, it has occurred to us that great misapplications of capital might be prevented, if the public could be induced to examine, more closely than it has hitherto done, the different subjects of enterprise presented to its attention in our country. Various and extensive as our schemes are, there seems to us necessity for care in the selection of objects on the part of the public, proportionate to the want of it in our state legislatures. At the present rates of interest in this country and in Europe, it is obvious that the most promising enterprises only should be undertaken. Of these, some may be fit objects for execution by a state, but not by individuals; and in cases where lines of improvement properly carried out promise large results, disappointment may ensue if they be executed on an ineligible plan, or on a scale incommensurate or more than commensurate with the object. We are induced to avail ourselves of the publication of Mr. Chevalier, at the head of this article as a text to present some reflections on this subject. The philosophic and comprehensive mind of the writer generalizes, in the following sketch, the object of improvement in the United States:

"The territory of the United States consists, first, of the two great interior basins of the Mississippi, and of the St. Lawrence, which descend, one from the north towards the south into the Gulf of Mexico, the other from the south towards the north into the bay to which it gives its name; secondly, on its eastern coast, of a system of lesser basins which discharge into the Atlantic, and the principal of which are, those of the Connecticut, the Hudson, the Delaware, the Susquehannah, the Po-

tomac, the James River, the Roanoke, the Santee, the Savannah, the Altamaha. The Allegany mountains, which are called the *back bone* of the United States, on account of their form lengthened out regularly with the continent, constitute a natural separation between the two great interior basins, and the system of lesser basins on the Atlantic coast.

"This immense country may likewise be divided into north and south. It has two commercial capitals, New York and New Orleans, which are as the two lungs of this great body, the two galvanic poles of the system. Between these two divisions, the north and south, there exist radical differences in their political condition and habits of life. The social edifice of the south is founded on slavery, that of the north on universal suffrage. The south is an immense cotton plantation, with some other products, such as tobacco, sugar, and rice. The north acts as the commission merchant of the south, in selling its products, and procuring those of Europe for it; as its mariner, in carrying its cotton across the ocean; its manufacturer, for all household and agricultural utensils, *cotton gins*, steam engines for making sugar, furniture, and stuffs, and all objects of every day use. It supplies the south also with flour and salted meats.

"It follows from the above, that in the United States great public works must have for their objects,

"First. To bind the shore of the Atlantic with the country west of the Allegany; that is to say, to connect rivers, such as the Hudson, the Susquehannah, the Potomac, the James river, or bays, such as the Delaware or the Chesapeake, either with the Mississippi, or its tributary the Ohio, or with the St. Lawrence, or the great lakes Erie and Ontario, whose waters are conveyed by the St. Lawrence into the sea.

"Second. To establish communications between the valley of the Mississppi and that of the St. Lawrence, that is to say, between one of the great tributaries of the Mississippi, such as the Ohio, the Illinois, or the Wabash, and Lake Erie, or Lake Michigan, which lakes of all those which have an outlet by the St. Lawrence, extend farthest south.

"Third. To connect the north and south poles of the Union, New York and New Orleans.

"Independently of these great systems of public works, which are in progress of construction, and even in part executed, there exist secondary groups of lines of transportation, having for objects either to facilitate the access to centres of consumption, or to open outlets to certain centres of production. The first of this class of cases embraces different works, canals or rail-roads, which leave the great cities as centres, and radiate in different directions around them. The second comprises such works as have been executed to bring into market different coal fields."

Mr. Chevalier proceeds to inform us how far these objects have been carried out, and gives us in minute detail, an account of the different lines of communication executed and in progress at the time of the publication, of his pamphlet. Few Americans are, we believe, fully aware of all that has been done in our country, and all may read the clear and comprehensive digest of Mr. Chevalier with profit. He shows that lines of improvement have been executed, or are in progress, to connect most of the lesser basins of the rivers flowing into the Atlantic with the two great interior basins west of the mountains. All of these lines of communication, with the exception of the great canal of New York, are entirely or in part by rail-road; the Pennsylvania and Virginia lines of improvement, embracing that mode in part, whilst the New York and Erie rail-road, the Baltimore and Ohio rail-road, and the proposed communications in South Carolina and Georgia, look to the rail-road system of improvement throughout. The elevation and character of the Allegany range, being generally without any table land from which reservoirs can be supplied, makes this the only mode of traversing it at any reasonable expense.

There is, however, no doubt, that for the bulky transportation between the west and east, rail-roads of any profile which can be had across the Alleghany, promise results by no means commensurate with what may be expected from them under advantageous circumstances. Moderate elevations on a rail-road, to be overcome by short ascending and descending grades of gentle inclination, present no serious impediment, when the business of the road (as in the case of travellers and the mail) requires high velocities. At high rates of speed, the whole adhesion of the engine cannot be made use of, of course there can be no deficiency in this respect, and but little power being required in descending grades, steam is accumulated for encountering the ascending, so that almost as great an amount of useful effect is thus attained from a given power on an undulating road of gentle graduation, as on a level. The case is a very different one, when on a long line of rail-road the ascent is a continuous one to a culminating, point, whence the rail-road descends. If the ascent to be overcome is very considerable, it may be surmounted either by inclined planes and stationary power, or by graduation, or partly on each plane, but it is in any case a serious deduction from the value of the rail-road, in the one case, by the cost of keeping up stationary power, in the other, by the large deduction from the useful effect of the locomotive engine.

The Pennsylvania line of improvement, and the Baltimore and Ohio rail-road, present us illustrations of these two modes of overcoming elevation. On the former, the Allegany mountain is passed by a rail-road having ten inclined planes, kept up at an annual expenditure of not less than eight thousand dollars. The elevation overcome at these planes is of course to that extent a necessary tax on the trade between Philadelphia and Pittsburgh. On the Baltimore and Ohio rail-road, should the trade be a large one, a much heavier tax must be paid in a different form. On that line of improvement, inclined planes will be avoided, and in place of them, continuous ascending and descending grades will be adopted, both at Parr's Spring Ridge and the Allegany. These, it is understood, are, for considerable distances, at the rate of fifty and sixty, and in some cases, as much as seventy or eighty feet per mile. On such grades, the load drawn by a locomotive will not exceed the fourth of what it would be on a level, and the cost of transportation to the company must of course in nearly the same ratio be increased.

The above suggestions go to show, that the cost

of transportation on lines of rail-road, between the east and west, south of New York, must necessarily be much enhanced beyond what may be considered its minimum. Whilst, under these circumstances, the great and growing demands of the west will probably supply an abundant trade to all the avenues now being opened for it, disappointment would certainly be experienced, were it supposed that the revenues derived from the improvements would be in proportion to the trade. The great and peculiar expenses of transportation on these lines, however large their receipts, must necessarily increase in almost the same ratio. Fortunately, these lines of improvement, if not owned, as in the case of the Pennsylvania line, by the states in which they lie, are the property of corporations consisting essentially of states and towns, to which the other benefits to be derived from the improvements, and not the dividends in stock, have been the leading considerations to embark in them. Such is the case with the Baltimore and Ohio rail-road, the James river, and Kenhawa improvement, and the Charleston, Cincinnati, and Louisville rail-road. The stock of these companies is made up principally, in the case of the Baltimore and Ohio rail-road, by the state of Maryland and city of Baltimore; of the Chesapeake and Ohio Canal, by subscriptions of the states of Maryland and Virginia, and of the Federal Government, the latter having assumed the subscriptions of the corporations of Washington, Georgetown, and Alexandria; and in the case of the Charleston, Cincinnati, and Louisville rail-road, by subscriptions of the states of South Carolina and city of Charleston. It will be sufficient for the large subscribers to these great works, if the prosperity of the states through which they pass, and towns which they connect with the interior, is promoted in a degree correspondent with the expectation entertained in relation to them, and the amounts invested by individuals are probably but limited sums, which, they have been willing to contribute, even if lost, to promote by their example and countenance the improvements in which they have embarked.

It is obvious that it would not be desirable for individual capital to be invested to any great extent in improvements of this description. States and corporations, whose credit may enable them at favorable times to make loans in Europe at a reduced rate of interests, by adding to the revenues derived from them a very limited fund from taxation, may meet the interests occurring on their loans, and benefited as they are in more essential respects, may afford to wait long for a net revenue, equivalent to the interest on their investments; but to individuals, such investments to any great extent would prove certain bankruptcy and ruin.

It would be otherwise of the second class of improvements referred to by Mr. Chevalier, namely, those which are to connect the lakes and the St. Lawrence with the valley of the Mississippi, were it not that so many will probably be authorized as to destroy the productiveness by competition. The lowness of the summits, and abundance of water to obtained on them, admit of the construction of canals at many points at a very moderate rate of expense, and the extensive navigation on the lakes, and the Mississippi, and their tributaries, and the great agricultural and mineral wealth of the regions watered by them, ensure, whenever they may be even partially filled up with population, an immense trade. Lines of communication in this portion of the Union must, however, for some time yet be unproductive, and will always, probably, be unsafe investments for individuals, for the reasons already given.

There is no such uncertainty as to the third line of communication mentioned by Mr. Chevalier, that between New York and New Orleans. Connecting, as this does, the metropolis of the union with the great Atlantic cities of the northern and the capitals of the southern states, this line of communication has at the same time the advantage of forming the most direct line between the eastern and southern states, and of traversing a belt of country which presents, for the execution of a line of rail-roads, peculiar facilities. The public has evinced its perception of the advantages of this great line of thoroughfare, by the large amount which has been contributed within the last six or eight years, almost entirely from individual resources, to its execution. The separate links which have been so far made, bid fair, even should it not be extended beyond its present terminus in the south, to be extremely profitable; but there is scarcely a doubt, that within six or eight years more, the whole chain of communication will be completed to New Orleans, and that there will then be a travel and trade over every portion of it, beyond any present conception of its extent.

At the time of the publication of the sketch of Mr. Chevalier, detached links only in this chain of communication had been made as far as the Roanoke, in North Carolina. Within the two years which have since elapsed, the Philadelphia and Baltimore, the Richmond and Fredericksburg, and Richmond and Petersburg rail-roads, have been put in operation; and south of the Roanoke, lines of rail-road have been completed to Wilmington in North Carolina, at the mouth of the Cape Fear, and to Raleigh, the capital of the state on the more direct route to Columbia and Augusta. Between Columbia and Branchville, on the line of rail-road which connects Charleston and Augusta, a rail-road is now in progress of construction, which, it is understood, will be completed in the course of the present, or early the coming year, leaving only the distance between Raleigh and Columbia (about two hundred miles, but which is said to be of extremely easy execution) to be constructed, to furnish a complete rail-road communication between New York and Charleston and Augusta. Between Augusta and Montgomery, on the Alabama river, whence to New Orleans there is for about two thirds of the year an excellent steamboat communication, rail-roads now in progress of execution will probably be finished by the time the line north of Augusta is in readiness.

Great profits may undoubtedly be anticipated in every portion of this great chain of communication, when executed with tolerable judgment and under favorable charters. In another point of view, however, it is much more interesting to us. No line of improvement which has been projected in America, and perhaps none which can ever be made, is so important in a political as well as a commercial aspect, as the one we have been contemplating. In time of war, the government will be enabled by it, with a moderate standing army, to provide for the defence of its whole Atlantic coast,

an object not to be attained effectually without it by the whole force of the country. It will furnish, in such a contingency, the means not only of transporting men and munitions of war, but in the event of the blockade of the coast, of exchanging the staples of the south and the manufactures of the north and east. In the estimation of the patriot, devoted above all things to the preservation of the Union, this connexion, between what Mr. Chevalier terms *its two poles*, has yet a higher value. "When," he remarks, "New York shall be only six or eight days' journey from New Orleans not only for a rich class travelling in a privileged manner, but for every shopkeeper and every workman, separation will be no longer possible. Great distances will have disappeared, and this Colossus, ten times vaster than France, will maintain its unity without effort."

It is among the many fortune circumstances of our country, that its most essential line of improvement offers such strong inducements to its speedy execution, both in prospects of profit presented by it as an investment, and its other advantages. In other countries, the works essential to their defence and protection have been executed usually at great cost, and with heavy burthens on the subject. With us, the one which is to make us impregnable in war, and to unite us indissolubly in war and peace, is, at the same time, to add largely to the wealth of the nation, and of the shareholders of the companies co-operating in its execution.

We have observed above, that *lines* of communication may be judicious, and *the plan* of improvement be otherwise; or, if the line and plan of improvement be both eligible, an error may be committed in making the improvement incommensurate, or more than commensurate with its objects. We need only refer, in illustration of our position, to the opposite plans of connexion by canal and rail-road, or to the case of a single or double track rail-road. It will be easily perceived, that a trade or travel, which would pay a large profit on the stock of a rail-road, might not be commanded by a canal, and *vice versa*; and that whilst it would be a great error to make a double track rail-road where a single track rail-road would suffice, it would not be a less error to construct a road graded for a single track only, where a double track would be required.

There are, comparatively, few cases in our country, where there is a choice as to the plan of improvement. Its bold features, and the extreme heat of its summers, limiting the cases in which canals can be made to comparatively a small number; but where either a canal or rail-road may be adopted, it is obvious that a great error would be committed by selecting that least suitable to the circumstances of the case and the trade to be accommodated. In our opinion, and the opinion of engineers who have given most attention to the subject, there are three cases in which rail-roads present decided advantage over canals:

1. *Where persons, or articles of great value are to be transported.* In this case, the saving in time becomes a matter of much more moment than any increased cost of rail-road over canal transportation.

2. *Where great differences of level are to be surmounted.* In this case, the delay and risk of interruption from a large amount of lockage, is far beyond what would be occasioned by inclined planes overcoming the same elevation on a rail-road, whilst the same causes increase the cost of canal transportation to so nearly an equality with that of rail-roads, as to entitle the latter to the preference.

3. Where, no matter how bulky, or ponderous the tonnage in proportion to its value, the trade is principally a descending one, and *a profile can be had for their rail-road giving equal or nearly equal facilities to the power employed in both directions.*

In this last case, rail-road transportation, more advantageous in other respects, becomes *even cheaper* than that on canals, in consequence of the fall in the line, which, in the case of the canal, would present a serious impediment by the lockage it would occasion, becoming an auxiliary to the power employed on the rail-road. There are but few cases, of course, where *the most desirable* profile has been had for a rail-road, the descent being, in most cases, either somewhat more or less than would be in theory the most advantageous. One of the most remarkable approaches to it seems to have been made in the case of the rail-road now under construction between Philadelphia and the anthracite coal district at the Schuylkill in Pennsylvania. On this work the graduation is said to vary between a level and descent of nineteen feet per mile, in favor of the downward trade. It is expected that the load of ordinary locomotive engines on it, will average from one hundred and fifty to two hundred tons net, or three hundred tons gross, travelling at the rate of from ten to twelve miles per hour, and that the whole expense to the company, of transporting coal on it, will be only fifty-three cents per ton the whole length of the rail-road, (ninety-six miles,) or little more than half the ordinary rate of freight on canals of the same length.

The above propositions can, of course, not be laid down absolutely, or without reference to the cost of the one or the other improvement; but, in the first case cited, it would require a very great difference of expence to counterbalance the decided superiority of the rail-road in point of expedition, and in the second and third cases, the item of lockage will generally enhance greatly the cost of a canal beyond that of a rail-road, and of course, turn the scale more decidedly in favor of the latter improvement.

It will be seen, from what has been said, how vague are the notions usually entertained as to the relative advantages of canals and rail-roads; advocates being constantly found of the one or the other system, without reference to the circumstances of the case, which should alone decide, where there is a choice, which is the most advisable. It would be individious to point out cases in which grave errors have been made in consequence of the confusion of ideas which has prevailed on this subject. Such cases, if the principles which have been laid down are correct, will readily occur to our readers, and we are probably indebted to the fact above mentioned,—the comparatively few cases in which canals are feasible in America,—that more mistakes have not hitherto been committed.

But supposing the proper description of improvement to be adopted, it may be executed on a plan incommensurate, or more than commensurate

with its objects. In the way of canals, the Union canal in Pennsylvania, and the Chesapeake and Ohio canal, are examples of opposite errors on this subject, it being now generally conceded, that the former, had it been constructed of larger section, and with larger locks, so as to have admitted of the passage of such boats as are used on the Schuylkill and Susquehannah canals, could not have failed to have been a productive work, whilst the dimensions of the Chesapeake and Ohio canal seem not to have been warranted by any trade to be anticipated on it. To make a double track rail-road where a single track rail-road is sufficient, is evidently an equally grave error; but not more so than others which may arise in works of this description, from inattention to their objects and the best means of attaining them. A few words will be sufficient to show what serious mistakes may be committed on this head.

It has been above observed, that short ascending and descending grades present no serious impediment, *at high velocities*, to the most valuable application of locomotive power. They, are, consequently, not seriously objectionable on rail-roads for passenger transportation exclusively, on which high velocities will always be aimed at, and where the whole adhesion of the engine is not required. It is otherwise, however, on rail-roads designed for freight. On these it is most essential that the company should be able to transport *cheaply*, and this, in rail-road transportation, is only to be effected by carrying *heavy loads at slow velocities*. Now, at very reduced rates of speed, the limit to the useful effect of the engine is its adhesion, and the load which this will admit of its taking becomes diminished, therefore, precisely as the maximum grade of the road increases, whether this be a longer or shorter one.

This being the case, it follows, that on roads destined for the transportation of freights, a much greater expense is justifiable to avoid undulations or to diminish the grades of the roads, where ascents and descents are unavoidable, than on roads destined for passengers. On these last, undulations not exceeding twelve or fifteen feet per mile would be scarcely an objection; whilst on roads designed for the transportation of freight at low velocities, they would almost diminish the load conveyed one half.

In these last, however, the expense which is justifiable to improve the grades of the road, must be materially influenced by the amount of trade to be anticipated on it. If this is but limited, it is, of course, better that the road should be less perfect, and cost of transportation in consequence enhanced, than that an increased first cost, more than commensurate with the object, should be incurred in reducing it; and, on the other hand, the largest outlay may properly be incurred in improving the profile of a rail-road, in a case where the trade to be accommodated is of proportionate magnitude. Giving to these considerations their proper weight, it will be seen of how much importance it is that engineers, however well informed in the science and practice of their profession, should be also men of discriminating minds and sound judgment. Their employers are otherwise exposed to the greatest losses, not from a deficiency in their knowledge, but a misapplication of the resources of their profession, the error being equally great to construct an improvement inadequate, or more than adequate, or superior or inferior in character, to what its objects may justify.

The *exposé* of the Chevalier de Gerstner gives some statistical views in relation to the rail-roads of our country, which may be interesting to most of our readers. After having made a tour of inspection over most of the lines, in the course of which he was received with the greatest kindness by the presidents, directors, and engineers of the different works, who, he mentions, not only gave him their printed reports, but laid before him with the greatest liberality their books and accounts, in order that he might have every kind of information, he gives the following as the result of his examination:

"According," says he, "to the facts collected during my travels since my arrival in New York, there are now, *over three thousand miles of rail-roads completed and in operation in the United States:* four hundred and twenty-five locomotives, of which the greatest number were made in the country, run on the several rail-roads; and I believe that up to the end of 1839 the length of rail-roads in the United States may amount to four hundred thousand one hundred miles. The capital expended on the rail-roads now in operation is about sixty millions of dollars, or at an average of twenty thousand dollars per mile, for which sum the rail-roads, with the buildings, have been constructed, and the necessary locomotives and cars bought.

"Several rail-roads have been undertaken with insufficient means, and the shareholders found themselves under the necessity of employing the income of the first years in building engine houses, &c., and purchasing locomotives and cars. In consequence of this, the shareholders got during that time no dividend, but the rail-road still yielded a good income. Other rail-roads, when finished, paid from five to ten per cent. income to the stockholders. Others have not yet paid any dividend for want of a sufficient number of passengers and freight. The *average result* of the rail-roads now in operation in the United States is, *that they give a yearly interest of five and a half per cent. on the capital invested.* This result may be regarded as very satisfactory, because the greatest part of the lines have only been a few years in operation.

"In all lines, there is a yearly increase of at least fifteen to twenty per cent. in the gross income, so that even those lines which do not pay now will give in a few years a handsome dividend. Accordingly to these statements, based on the communications collected in this country, I have no doubt that the large capital invested in rail-roads in the United States will not only produce an incalculable benefit to the country, but also pay the shareholders a handsome dividend, which, under good management, by the constant progress of population and trade, must likewise from year to year increase."

The above opinions, founded on the careful examinations made by the Chevalier de Gerstner, are certainly calculated to give great confidence in the investments hitherto made in rail-roads in our country. If the average net profits accruing on the whole capital stock invested in them has been already five and a half per cent., even though it has been necessary in many cases to appropriate it to improving the rail-roads, building engine

houses, etc., and purchasing locomotives and cars, it is a proof that most of the rail-roads so far undertaken are valuable lines and judicious undertakings. It is no doubt, in some cases, inconvenient to the stockholders of such of them as are obliged to appropriate their receipts towards carrying out their original scheme, or to extensions of it, to be deprived temporarily of their dividends, and this measure must of course have the effect of depressing the shares of such of the companies as may resort to it. The course is, however, obviously the proper one, where an increasing trade and travel on a rail-road calls for increased accommodation on it, the means for which cannot be found without an issue of certificates of stock or bonds of the company at a serious sacrifice. Pursuing such a policy, the rail-road companies whose business is increasing must be placed at the earliest period on a solid and secure foundation, and the stockholders, when their improvements have been perfected and fully equipped with motive power, be secured steady and permanent dividends, and much better returns than could have been obtained on any other plan.

OBSERVATIONS UPON THE METHOD OF GROWING APPLE AND PEAR TREES BY GRAFTING UPON THE ROOTS.

From the Magazine of Horticulture.

Among the most valuable hints which have recently come under my notice, I consider none of more importance than those advanced by your correspondent, Mr. Teschemacher, and so ably responded to by yourself, on a free communication among gardeners. Gardeners, of all other classes of men, ought to be the last to aim at concealment, in any improvement which they may effect. Mystery is a word which ought to be banished from the gardeners' vocabulary. Horticulture embraces a range so wide, and minutiæ so intricate, that, without a free communication among its practitioners and amateurs, the most accurate observer and persevering gardener could, from his own experience, attain but a faint knowledge of a business whose branches are so multifarious, and where the routine of operations embrace so wide a field. Upon this impression, I beg leave to communicate, through the medium of your valuable pages, a system of growing fruit trees, which, although not possessing novelty, is certainly not so extensively known as its merits deserve.

Grafting on the roots of apple and pear trees has long been partially practised; but I question if there are many nurserymen who have carried this to any great extent. I have had various opportunities of testing the practice, and I am perfectly satisfied of its efficacy. The stocks for performing the operation in a proper manner, ought to be only a year old. If they have been grown in a deep free soil, (which, for this method, is absolutely necessary,) they will have roots from six inches to a foot in length, of a fusiform shape, and of a sufficient thickness to receive a scion. In the fall they are taken up and laid in by the heels, in a cellar or other convenient place, until required. A quantity of scions is selected at the same time, which must be carefully assorted and properly tallied: these may likewise be placed in a cellar in sand, or, failing a good cellar, dig a pit about six feet deep, in a dry situation, place the scions in an upright position, covering them nearly to the top with light soil or sand; place boards over the surface of the pit, leaving a vacuum of three or four feet between the scions and the boards, over which a sufficient quantity of soil is to be put; then cover the whole with rank litter, or such other substance as will prevent the frost from penetrating through the soil; this will also ensure an easy access to the scions when required.

In the month of February, if there is much grafting to be performed, operations may be commenced. The woody part of the stock is cut entirely away, and the root only used, which must be cut into lengths of three or four inches, one root yielding frequently three or four stocks. Grafting is performed in the usual manner, and when the operation is finished, they are placed in shallow boxes, over a layer of rich, light soil, burying the whole grafted part under ground; they are put in rows across the box, as thick as they can be placed beside each other; after the first row is properly placed, put about two inches of the soil as a separation between it and the succeeding row, and so on until the box is filled. Several sorts may be placed in the same box, only let each sort be perfectly distinct, and regularly named. When the box is filled, it must be placed in a shaded part of the green-house,* not exposed too much to the sun's rays,—on the back shelves, or under the stages will answer very well for some time, say until the middle of April, when they must be gradually inured to the light and air, until finally planted in the usual manner in the open ground, in the month of May. A perfect union will have taken place, and shoots of those grafted in February will have elongated from three and four to six inches.

The benefits derived from this system must be perfectly obvious. The grafting is performed at a season when little else can be done; the trees are much handsomer than those grafted in the usual manner, and the time occupied in planting out is very trifling, being planted with a common dibble; a good hand will plant several thousand in a day. I have known a nurseryman in this state graft above one hundred thousand apple trees in a season, and in two years they were handsome saleable trees.

Yours, very respectfully,

ALEXANDER GORDON.

June 21, 1840.

METHOD OF CROPPING ONE QUARTER OF AN ACRE, AS PRACTISED BY L. VAUGHAN, WILLIAMSBURG, L. I.

From the Magazine of Horticulture.

Being but a tyro in the cultivation of mother earth, I shall confine my reply to your call to *facts*, and leave *effects* to my seniors. You think the quantity produced from one fourth of an acre, large; yet, I now see, I could have made it larger.

1839.—Made hills for egg plants, in each of which I deposited half a bushel old horse-manure —labelled the hills to find them again.

* A common frame will answer where there is no green-house, only it will be necessary to shade with mats during the heat of the day, and also to cover them during cold nights.

Feb. 24.—Planted, this day, broad Windsor beans over the hills prepared for egg plants;—planted over the broad beans, spinach, radish, cress, and lettuce, all of which did very well, and were off the ground before the beans required hoeing. The beans grew to their usual size, but were not so prolific as they are in England.

From May 11th to 20th, turned out egg plants from pots into the prepared hills, amidst the broad beans. The beans were off the ground from the 15th to the 20th of June, and were a protection to the egg plants from the severe storms and cold weather of 28th May to 5th June. About the middle of August, sowed turnips, in drills, between the eggs, and some of them made very fair roots.

March 7th.—Prepared hills four feet apart for tomatoes and Lima beans, with half a bushel of old horse manure in each; labelled the hills to find them again; planted peas in drills *north* and *south, close by* the hills for tomatoes and beans.

April 22 to May 10.—Turned out tomatoes from pots into the *prepared hills by the peas.* I placed a pole in each hill for tomatoes and Lima beans, at the time of making the hill, and tied the tomato to the pole as you would a dahlia. Planted Lima beans under a sash, on the 27th of April, and transplanted them into the hills *by the peas* on the 14th of May. The peas were of great service to the beans and tomatoes during the cold weather and storms above alluded to; the peas were off the ground from the 10th to the 20th of June. In hoeing the Lima beans and tomatoes, *I trenched between them for celery!* which I transplanted from its *nursery* bed the first week in August. The Lima beans were off the ground from the 1st to the 10th of September. I think the beans were *decidedly* favorable to it for the first fifteen to twenty days. I have never found the Lima bean to grow, or even *ripen*, much after the 10th of September. The celery between the rows of tomatoes was very poor, as I found it impossible to confine the tomatoes to the poles, and they shaded it too much.

When gathering my vegetables, I selected those *nearest the second crop*, to give it the benefit of all the light and air I could. I kept constantly growing in pots, melons, corn, cabbages, &c., and *the moment* I cleared the ground of *even one* hill of corn and potatoes, or any thing else, a *pot* of *some other* vegetable was turned into its place.

No one must attempt the three crops without *good ground made better* by rich old manure. I have this day tomatoes on my vines as large as a pigeon's egg; melons, egg plants, &c., equally as forward. My early cedo mulli peas are all *off the ground to day*, and late melons from pots take their place. Some of my early dahlias blossomed last week, the flowers large, and colors as brilliant as those later in the season.

Yours, truly, L. VAUGHAN.

Williamsburg, L. I., June, 1840.

PROPER REGARD TO, AND MANAGEMENT OF SLAVES.

From the Carolina Planter.

Fairfield District, July 2, 1840.

Dr. R. W. Gibbes—I have read with much interest your valuable journal ever since its first appearance, and find myself more and more pleased with it, from the fact that much useful knowledge may be culled from it, and particularly by inexperienced young planters. And many valuable hints are conveyed through its columns, which would otherwise lie dormant and useless, and perish with their originator—a state of things much to be regretted where so much information upon small as well as larger matters is requisite in the multifarious duties of the planter and husbandman.

While others, abundantly more competent than myself, are discussing the more weighty matters, and not only endeavoring, but succeeding in elevating the character of the tillers of the soil, the mainspring of all occupations—I feel a disposition to throw in my mite upon a subject too much neglected, but one of infinite magnitude, and pregnant with evil; so much so, that inadequate as I may feel myself to be I have no doubt but that I may cause the guilty to blush—I mean a proper regard to, and management of slaves.

There are, in all concerns of life, extremes much to be regretted and avoided; and to an alarming extent is this the case in not using a proper, close, uncompromising discipline over negroes, keeping in mind at all times the line of distinction between master and servant, and prohibiting entirely the association of any and all white persons from intercourse with them who do not observe the same rule rigidly, and all innovations to said rule should be fearlessly, instantly, and promptly punished. Upon the other hand, however, there are many, very many weighty responsibilities due from masters to slaves—and it is a source of just satisfaction to the exalted citizens of our own state, and the south generally, to know that many of these obligations they daily acquit themselves of most honorably, as in the daily allowance of food, clothing, and comfortable cabins—and of at least paramount importance, only a moderate service is required, all of which, in the eye of the humane, or even judicious owner, are necessary, scrupulously so, for his own advancement, if not to satisfy the risings of a benevolent heart—which is, with but few exceptions, the prompter to good deeds. But there are exceptions to this rule of conduct, which deserve our attention and action, from its source being diametrically opposed to both the laws of GOD, and man, and to reason, common sense, and self-interest. The more to be regretted, too, from the fact that such inhuman owners of slaves frequently perturb whole neighborhoods, and inflict, measurably, disgrace upon whole districts, yea, states: an instance in confirmation of my position, I will offer. A gentleman is travelling through Fairfield district, and discovers, on the Sabbath or Lord's day, 20 or 30 negroes in the fields in the performance of their daily labor, cotton gins, screws, and wagons, all running—he is a perfect stranger, knows no one, and of course knows not who to blame. In mixed company this may become the subject of conversation, and a benevolent, humane slaveholder may chance to have his feelings tortured innocently; but being a resident of the district in question, cannot deny it, to his sorrow, and to the shame of the perpetrator. And worst of all, it exerts a powerful and baneful influence upon the morals of the young and rising generation, and should be suppressed at all hazards.

I regret to say that I know large slaveholders and otherwise honorable men, who, I believe, feed

and clothe well, but who do exact too rigidly from their slaves—as the performance of all errands is done at night, such as the errands to the store, blacksmith's shop; and with some the labor of packing cotton, &c., and as before remarked, they exact from them the Sabbath, the day given them by their Maker for the best and wisest of purposes, for religious observance, and in which they may recover from the exhaustion and fatigue incurred from 6 days of labor in a hot, melting sun. The penal statutes of our state should be enforced, but a mistaken delicacy interferes, and they escape the laws: but most certainly they are a mock, a by-word and reproach, and justly deserve the indignation of all who treat their slaves as their great Author designs, neither deserving the name of planter, patriot, or statesman, and should never be nor indeed are they esteemed by those. But standing guilty before that tribunal which has said, "Servants be subject to your masters with all fear, not only to the good and gentle, but also to the froward; and also, masters give unto your servants' that which is just and equal, knowing that ye also have a Master in heaven."

My strictures, Mr. Editor, may be thought to cut too close, but should the shoe fit let it be worn. You may, however, think them out of place, if so, please to exercise your own discretion in their use, and the writer will be satisfied.

A YOUNG PLANTER.

JOURNAL OF A RECENT VISIT TO THE PRINCIPAL VINEYARDS OF SPAIN AND FRANCE;

Giving a minute account of the different methods pursued in the cultivation of the vine and the manufacture of wine, with a catalogue of the different varieties of grape; an attempt to calculate the profits of cultivating the vine; an estimate of the profits of Malaga fruits, &c.*

By James Busby, esq.

Preface by the editor of the first London edition.†

It is singular that among the many books on wines now existing, there is scarcely one to which a person in search of sound practical information can profitably refer. These books appear to have been chiefly written by amateurs and theorists, whose acquaintance with their subject had either been entirely formed over their "wine and walnuts," or who, with but slight reference to facts, had taken their opinions on trust from the conjectures of those who had preceded them. But the conjectures and speculations of persons who have never visited a wine country, or who have only hurried through one in the diligence, are alike barren of information and entertainment; and thus it often happens that treatises upon wines are about the *driest* of all reading. They have neither the grace of fiction nor the utility of truth.

The little volume here presented to the public we have no hesitation in ranking in a very different class. The author, possessing an intelligent and inquiring mind, and carrying along with him a distinct and practical purpose, pursues his way over a tract of the finest wine country in Europe, and notes down his observations and the result of his inquiries, in a plain, brief, intelligible and interesting manner. If wine countries were often visited in this way, and only *facts* judiciously detailed, we should not find, as we do at present, books on wines to be for the most part mere perpetuations of error; but each writer, adding his careful gleaning of facts to those of his predecessors, all the information on this topic which is of public interest or utility would speedily be accumulated.

It is only necessary to add, that besides the author's valuable and accurate remarks on the cultivation and manufacture of wines, the journal contains some useful observations on the culture of the olive and other fruits, and on Spanish and French agriculture generally. The work, as will be seen by the author's preface, was originally published in New South Wales, where Mr. Busby is now settled. The present edition is, therefore, a reprint, with the view of introducing the book to a more extended circle of readers.

London, June 28, 1834.

Tables of Spanish Weights, Measures, and Moneys.

WEIGHTS.

4 Arrobas	-	-	1 Quintal.
1 Quintal	-	-	102¾ lbs. English.

MEASURES.

6 Arrobas mayores	25 galls. English old measure.
1 Butt of wine contains	30 Arrobas mayores.
13 Arrobas menores	39 galls. Eng. old measure.
1 Pipe of oil contains	34 Arrobas menores.
25 Arrobas mayores	32 Arrobas menores.
5 Fanegas	1 Quarter English.
27 Varas of Castile	25 Yards English.
1 Aranzada	1 Acre English.

MONEYS.

Piastre 20 Reals Vellon 10§ Reals Plate	1 hard dollar.

☞ In this edition, the author's calculations in British currency have been reduced to United States currency, at $4 75 the pound sterling.

JOURNAL, &c.

Monday, 26th September, 1831.—Having embarked at London on the 6th of the present month, I this day landed at Cadiz. I had here the good fortune to meet with Dr. Wilson, an English gentleman, to whom I had brought a letter of introduction; and as he was about to return to the house of his brother, an extensive wine merchant of *Xeres de la Frontera*, I accepted his invitation to accompany him to that place, on Wednesday next.

28th September.—At three o'clock this day, I accordingly joined Dr. Wilson in hiring a passage-

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* From the time this work first came into our possession it was designed to reprint the whole, in the Farmers' Register, as soon as so much spare space could be allowed. We had at first thought merely to extract the parts relating to vines and wine, omitting all other connecting passages on other subjects. But by such omissions, not much even in space would have been gained, and more would have been lost in the interest of the Journal, and its value as an entire work. It is therefore given entire, with the exception of the author's preface, and the appendix.—ED. F. R.

boat to cross the bay of Cadiz, in order to avoid the delay of the common ferry-boat. Port St. Mary's, the town at which we disembarked, is chiefly occupied by persons engaged in the wine trade, and from this place the sherry wines are shipped. It took an hour and a half to cross the bay, and another half hour to engage a *calesa*, and forward our baggage; after which we proceeded on our journey. Four or five miles out of Port St. Mary's, the country consists of a coarse barren sandstone, partially covered with gravel, excepting on the banks of the river, which have the appearance of great fertility. We stopped at a *Venta*, or public house, to obtain a glass of the wine called *Manzinilla*, the *vin du pays* of the district, which Dr. Wilson assures me is preferred to all other wines by people of all ranks in the country; it is not known in the cellars of the English merchants, but is a light, pleasant beverage, having at the same time a mellowness and flavor, which I have no doubt would, after a little habit, procure for it the preference even of those who would find it insipid at the first trial.

The twilight was far advanced as we entered the wine district; at one place we could distinguish a man with a musket who had been posted to watch the grapes, it being now the middle of the vintage. At half past seven, we entered the town of *Xeres*, which is reckoned one of the richest, if not the very richest in Spain, in proportion to its population, and which owes its wealth entirely to the valuable wines produced in its vicinity.

Friday, 30 *September*.—A violent storm of wind and rain made it impossible to quit the house yesterday, and though the rain continued to fall at intervals to-day, I managed to visit, in company with Dr. Wilson, the cellars of the house of James Gordon and Company. The extent of these cellars is quite immense: the extreme length of the largest being 110 Spanish *varas*, about 306 English feet, and the breadth 222 feet; the roof is supported by rows of massive square columns of mason work; and although the whole cellar is not of the above length or breadth, the principal division of the building being only 200 by 150 feet, yet, with its various adjuncts, the whole extent of the cellar is equal to the dimensions first stated. Messrs. Gordon and Company have also another very extensive cellar, though not equal to this in dimensions. Their ordinary stock of wine is said to be 4000 butts: this is kept in casks of various sizes, containing from one to four butts. These casks are ranged in regular rows; in some parts of the cellar, to the height of four tiers. They are called *soleras*, and are always retained in the cellars. They contain wines of various qualities and ages —from one to fifty years. The wine merchants of *Xeres* never exhaust their stock of finest and oldest wine. According to the price at which the wine expedited to the market is intended to be sold, it contains a larger or smaller proportion of old wine. But it is only in wines of a very high price, that even a small portion of their finest wines is mixed. What is withdrawn from the oldest and finest casks is made up from the casks which approach them nearest in age and quality, and these are again replenished from the next in age and quality to them. Thus, a cask of wine, said to be fifty years old, may contain a portion of the vintages of thirty or forty seasons.

The more respectable of the wine merchants of *Xeres* never ship wine for England till it has attained the age of two years; that is, till the bulk of the wine has attained that age. But according to the price it is proposed to bring, it contains a larger or smaller mixture of a more or less expensive wine. The higher qualities of sherry are made up of wine the bulk of which is from three to five years old, and this is also mixed in various proportions with older wines. Thus, from the gradual mixture of wines of various ages, no wine can be farther from what may be called a *natural wine* than sherry. But besides giving the wines, as they are prepared for the market, mellowness and richness, by the addition of older wines, there is a very dry kind of sherry called *Amontillado*, or *Montillado*, which abounds in the peculiar nutty flavor that distinguishes sherries, and which is frequently added when that is deficient. Being very light in color, it is also used to reduce the color of sherries, which are too high; and when on the other hand, color is required, the deficiency is made good by the mixture of *boiled wine*, or rather, of *boiled must*.

The lowest priced sherries are in general the growth of Port St. Mary's or San Lucar, two districts within ten miles of Xeres; or they are brought round from Malaga to Port St. Mary's, and thence transhipped for England under the name of sherry, perhaps after having been landed and mixed with other wines to give them the qualities in which they are deficient. All these lower priced wines are largely mixed with brandy, being intended for the consumption of a class of people who are unable to judge of any quality in wine but its strength. But brandy is added in very small proportions to the good wines; never in greater quantities than four or five per cent. while they remain in the cellar, and frequently not at all, unless the wine should become *scuddy* or *mothery;* and thus the finest wines are frequently entirely free from it; but on their shipment, a small dose of brandy is considered absolutely necessary, even to fine wines, to make them bear the voyage, as it is said; but, in reality, because strength is one of the first qualities looked for by the consumers. When wines become mothery in the London docks, they send them back to be cured; and this curing consists of nothing more than an addition of brandy: perhaps, indeed, it is chiefly effected by the motion of the voyage. The *soleras*, or store casks, in which the wine is kept, are left with a void of 1-15th of their contents, and the access of the air is admitted through a loose wooden bung, which merely covers without *closing* the aperture.

The exporters purchase the wine from the growers generally when it is one year old. The cellars throughout Xeres are very numerous, and are the most extensive buildings in the town. The wine constitutes the chief wealth of the inhabitants.

Saturday, 1*st October*.—The weather being more settled, about mid-day I rode out in company with Dr. Wilson, taking the road to Madrid, in a northerly direction from Xeres. The road, immediately after quitting the town, was execrable, as well as the streets themselves; but after passing the limits of the town's administration, and coming on to the road supported by the government, it was much better. The ground we first passed is a sandy loam on both sides, and near the town it was cultivated with great care for vegetables, every farm having its *noria*, or water wheel, to irri-

gate the grounds. We saw them planting garlic in small square divisions. The plants were placed on a bank which formed the square, about three inches above the surface. The squares were separated by channels for conveying the water, an interval being left at one of the corners of each square to admit the water to the interior, which was five or six feet in diameter. Some of the squares had also rows of plants on similar situations within them. In this, or a similar manner, all their vegetables are irrigated; and no one would think of laying out a garden unless on a spot where it could be continually irrigated. About a mile from the town we struck off into a plantation of olives; few of the trees, however, contained any considerable quantity, and some were altogether without fruit. Such olives as we pulled were universally rotten. I was afterwards told, by Mr. Gordon, that all olives are rotten this year, and that this is invariably the case every second year. A little further, we saw a new plantation on the opposite side of the road, and luckily found a peasant under a miserable shed of leaves and straw. To our questions respecting the olives, he informed us that the plants bear a little fruit even the first year; but in the second and third years they bear a considerable crop, in proportion to their size. Some of what we saw had been eighteen months planted, some only six months. The former appeared healthy young trees, covered with a considerable quantity of foliage; the latter had only a few slender shoots, and some of them indeed stood in their original nakedness. These olive plants were nothing else than large limbs of old trees, from eight to ten feet in length, and from two to three inches in diameter. They are sunk about four or five feet into the ground; and the part of the plant above ground is covered, during the first summer, with a cone of earth or clay, to the height of from two to three feet. After leaving this young plantation, we struck off to the left, and made for the nearest vineyard across the fields. In consequence of the very heavy rains during the two preceding days, most of the vineyards were deserted; the people in this part of the country almost universally living in the towns. We found no person in the cellar of the first vineyard we entered; but in the next there were two idle peasants lounging about the door of the cellar. Giving our horses to the younger, we entered into conversation with the elder *vinador*. The extent of the vineyard, he said, was 40 *aranzadas*, about 38¼ English acres. He said they usually made from 66 to 68 butts of wine; but this year they had only made 55, when the rains commenced, and he doubted now whether they could make any more. Sixty-seven butts from 38¼ acres, is equal to 223 gallons, *old measure*, per English acre. The soil was of the description called *Albariza*, which produces the finest wines.

The *vinador* stated, that in replanting a part of the vineyard, they had dug it to the depth of a *vara*, or Spanish yard—about 33½ English inches; but on proceeding to the spot where they had been trenched, and stepping into the trench, I found the surface only came to my knee. From twelve inches below the surface the soil was quite compact, but appeared to differ from the surface soil only in not having been exposed to the atmosphere. According to *Roxas Clementi*, a Spanish writer upon the vines of Andalusia, the albariza soils contain generally about 70 per cent. of carbonate of lime, the remainder of the compound being chiefly alumina, with a very small portion of silica, and occasionally a little magnesia; but in some places it is almost pure carbonate of lime. This soil absorbs every drop of moisture which falls upon it, and never cracks or opens in the greatest heats of summer. I paced over the piece of ground which had been trenched, and found it 45 by 16 paces, about 24 perches. This, he said, had occupied ten men for four days.

The distance of the plants in this vineyard was about five feet each way. Some of the vines were very old and appeared to be in very bad condition. The *vinador* said they were renewing them gradually, and thus the vineyard was not all in full bearing. Some plants, which were only six years old, appeared extremely vigorous; and as the grapes had not been gathered from a part of them, we counted the bunches on a considerable number, and found them to average eight or nine; and from our own estimate, and that of the *vinador*, the whole weight of the fruit might be from 14 to 16 lbs. on each. All the new varieties, he said, were of the variety called *Uva de Rey*. There was a dunghill of fresh horse dung collected outside the vineyard; and though we were uncertain whether we understood each other's meaning, we supposed him to say, that they manured each plant annually. The plants had each from two to four mother branches, according to their strength, and had almost invariably been pruned down to one or two spurs on each.

In the cellar there were four presses, which consisted of nothing else than large wooden troughs, about eight feet square, and from twelve to fourteen inches deep. This is the general size; and each will contain at one time, as many grapes as will yield a butt of wine. A coarse wooden screw stands in the centre of the trough, which is worked by a lever not more than five feet long in all, so that each arm is only two and a half feet. In some of the casks which contained the juice that had been last pressed, we observed a vessel, like a very wide funnel, fixed into the bung hole. The object of this is to return into the cask all the froth and wine which is thrown up in the fermentation; for, in this part of Spain, all the wine is fermented in butts, with only the bung hole open. By this means all the yeast, which the French are so anxious to get rid of, is returned upon the wine, *to feed it*, as they say. The consequence, of course, is a renewal of the fermentation whenever there is a change of weather, or the cask is put in motion. The wine continues in the butt in which it is fermented till March, when it is racked off the the lees. This is the almost universal practice of the country.

In the course of our ride we passed a flock of sheep, about 250 in number; the majority were black and short woolled. The wool is worked up into common cloth of its original color. It is worth 3 *reals vellon* (15 cents) per lb. The white sheep were of a totally different breed, with long white fleeces, more resembling hair than wool. We also saw two men on horseback, and several on foot, with a herd of cattle. The horsemen were the proprietors, who had been *mustering*. There were about three hundred in the herd, chiefly young, and all dry. The cows had little appearance of milk, and the breed was altogether bad. This,

as I was given to understand, was a fair sample of the sheep and cattle of the province. It is not lawful to enclose cornfields; nor, indeed, are any enclosures lawful, except for vineyards or gardens. As soon as the grain is off the fields, they are common property, and every one who chooses is entitled to send cattle or sheep upon them: a law which, perhaps, more than any other, strikes at the root of agricultural prosperity, and keeps the agriculture of Andalusia in its present barbarous condition.

Monday, 3d October.—Mr. James Gordon having invited Dr. Wilson and myself to visit a vineyard belonging to him, about four miles from Xeres, we accordingly started at about one o'clock; Mr. Gordon riding a *black barb*, or jennet, which he valued at £100 ($475,) and which he said had cost him £70, ($332 50.) We passed out of the town by this direction, as well as by every other, through hills of dung, which had been allowed to accumulate, and appeared to be considered as not worth taking farther. The road lay between immense hedges of the *cactus*, or prickly pear, and aloe, planted on the top of high banks, and making a fence which would prove a considerable impediment to the march of an army. Mr. Gordon pointed out a hedge of prickly pears two years old; and which, even though it had been on the level ground, would already prove a very tolerable fence. He is of opinion that the original plants, if properly looked after, will form a fence for forty years; and if renewed with occasional fresh plants, would last for ever.

The aloe is also much used for fencing, but is considered by Mr. Gordon as very inferior to the prickly pear, as it dies off whenever it has flowered. There is a prejudice that this plant flowers only once in a hundred years, and it is thence called the centennial aloe. The truth is, that though it is often many years in flowering, when it has once flowered it dies off for ever. If there is any part of the rural economy of the Andalusians which the settler of New South Wales could adopt with advantage, it is the hedge of prickly pears. It is not possible to imagine a more effectual fence, nor one which it would take less trouble to plant or keep in order. It is only necessary to place, at certain distances along the proposed line, a leaf, or part of a leaf, of the plant. In nineteen cases out of twenty they will take root without any further trouble; and in two years, or three at the farthest, there will be a more effectual fence than a four-railed one. The only objection to this kind of fence is the room it occupies after a few years' growth, if not pruned down: but, in New South Wales, we are not yet so much pressed for room as to make this an objection. To those who may feel inclined to adopt this recommendation it may be a useful hint. Though I was told it was scarcely possible to keep the prickly pears from growing, even by cutting the leaves into small pieces and throwing them on a dry spot, still it would be worth the trouble to place each leaf, or part of a leaf, in a spadeful of manure, both to insure its striking and its more vigorous growth.

The road to Don Jacobo's vineyard passed at first through banks of albariza, but we presently came to the *arenas*, or sandy soils, which adjoin the common of Xeres. Don Jacobo's vineyard was in this soil. His people had just recommenced the vintage after the rain, and were now assembled to dinner; which consisted of a kind of cold soup made from water, with oil, vinegar, salt and pepper, and salads scraped down, or cut small. The more substantial part of the meal was bread, prickly pears, sweet pepper and grapes.

I here tasted some of the boiled must which is used for coloring the wine. It was literally the *quintessence* of the *must*, having been boiled down to a fifth part of its original bulk. It was as thick as treacle, and resembled it in flavor, but with a strong burned taste.

Don Jacobo Gordon's vineyard yielded him, when in a good state, from 2½ to 4 butts of wine per acre. At present it is in a course of renewal, having been ruined by the spread of a grass which sends its roots to the depth of four feet. A certain portion, which had been planted within the last five years, appeared to be in a good state of bearing; another part was only two years old. The young vines were all very healthy, and had been cut down to two or three mother branches, with one knot on each. In forming the young vines, as well as in pruning them afterwards, great care is taken to have the branches in such a direction that they will balance each other upon the stock, the latter being generally from 12 to 18 inches from the ground before the branches spring out. The object of this care is, of course, to support the bunches from the ground without the aid of props or stakes. It cost £56 ($266) an acre to renew the plantation of this vineyard, it being necessary to trench it to the depth of four feet, in order to get out the grass. The soil, as turned up, even from that depth, was extremely sandy. The plants here, as elsewhere throughout the district, were at the distance of five feet from each other in both directions. The varieties which had been planted were the *Pedro Ximenes* and *Uva de Rey*, white, and *Tintilla*, black. Black grapes are, however, very rarely cultivated here. The different varieties were planted in distinct divisions. I observed that some of the old vines which it was intended to eradicate this season, were loaded with grapes, having been pruned to carry as many as possible. This is what the French called *charge à mort*, and the practice here was known by the name of similar import. The vines are regularly manured with any kind of dung; in general, strong stable dung: not every year, because, said Mr. Gordon's chief vinador, who accompanied us, he could not procure it. He would dung them every year if he had the means, and did not seem to consider that the quality of the wine would be affected by it. But this vineyard, as well as all others on the same kind of soil, only produced inferior wines.

The olive having been mentioned, we were shown two olives, which supported a wheel for drawing water from the well. Two posts having been required for this purpose when they were clearing the ground of some olive trees three years ago, they took two of the trunks of these, which were respectively 10 or 12 inches in diameter; they nevertheless took root, and are now covered with strong branches, affording a proof of the great facility with which the olive takes root. The *vinador* said that an olive would produce a crop three years after its plantation, but not a full crop till its fifth year, and would reach its greatest perfection in its tenth year. He said a plant ought

to be the limb of a tree of the thickness of a man's arm. Being asked how long it would take before a slip, such as we plant in New South Wales, would bear a crop, he appeared to consider the proposal as ridiculous, and said he thought twenty years. He did not consider the oil of young olives inferior to that of the old: the only difference in their value arises from their quantity. The olive is now cultivated in this district to the same extent as formerly, the superior attention bestowed upon it in the neighborhood of Seville having made the slovenly cultivation pursued here unprofitable. The trees are planted with considerable regularity, at the distance of 36 or 40 feet. An average crop, Don Jacobo says, "is from 1¼ to 1½ *arrobas*," that is, from 5 to 6 English gallons each tree.

In passing through this vineyard I observed a very considerable variety of grapes, differing not only in appearance but taste; but many of those which were evidently distinct were said by the *vinador* to be the same. He would not admit that there were more than four or five kinds. I should have judged the number to be not fewer than twenty; and Mr. Cormack, a member of Mr. Wilson's house, afterwards informed me that there was at least that number of varieties in all the vineyards round Xeres, and he thought this was one cause of the excellence of the wine. On our way back to town I examined one of the norias which supplies Xeres with water. The well was about 40 feet in depth, and 7 in diameter. The machinery by which the water is raised is of the rudest construction. A horizontal wheel with large teeth turns a vertical one of about five feet in diameter; over this wheel passes a flat band, made of a kind of grass, to which earthen pots are attached over its whole extent. The pots go down empty at one side and come up full at the other. The water is thus raised to a cistern of sufficient elevation to send the water to the town, about a mile off. It struck me that any settler of New South Wales could construct such a piece of machinery with his own men, and even without the aid of a mechanic.

Tuesday, 4th of October.—About 10 this morning, in company with my indefatigable friend Dr. Wilson, I started to visit the vineyard of *Don Pedro Domecq* celebrated, under the name of *Machar Nudo*, for producing first-rate sherry wines. After quitting the immediate vicinity of the town, we passed over open downs, which bore the appearance of having been under crop, but without a single enclosure or landmark so far as we could observe. The downs were skirted on the left by the chalky hills (*albarizas*,) covered with the vine, and carefully enclosed by hedges of the prickly pear and aloe, planted as usual on the tops, of high banks. We passed three ploughs at work, following on the same furrow. The plough is of the rudest construction, exactly similar to what are represented in those plates which exhibit the first invented implements of agriculture. There is no mouldboard, and the plough consequently makes only a series of drills, without turning a single furrow. It has only one handle, and is sometimes held in the right and sometimes in the left hand, the mules with which they generally plough being guided and driven with the other hand. As usual, when riding among vineyards, we entered the albarizas through a road between steep banks and hedges—the bottom of the road being in general the compact stratum of chalk. Don Pedro's vineyard lies in a north-easterly direction from Xeres, and consists entirely of chalky hills. It was evident, on entering the enclosure, that the vines were treated with much greater care than any we had examined. The mother branches were better balanced and supported from the ground, and were regularly pruned; and not a weed or a blade of grass was to be seen among them. The immediate vicinity of the house was tastefully planted with a profusion of ornamental trees, within which was an extensive paved court, surrounded by a wall and railing; the cellars were on a much larger scale than in any of the vineyards we had before seen or passed; the house neither large nor convenient, and in great degree spoiled by some of the rooms being made the passages to a high tower which he has built to have a view of all parts of the vineyard, and which has been carried to a great height, in order to command a prospect of Cadiz, on the south-west and Seville to the north. "A certain man planted a vineyard, and hedged it round, and having digged a wine press, and *built a tower*, he let it out to husbandmen." Every vineyard, of any considerable extent here, has also its tower, but, in general, they are less than half the height of that of *Machar Nudo*. Mr. Domecq is a gentleman of French extraction, and speaks English fluently. We found him under the verandah of his wine cellar, and having mentioned the object of our visit, he undertook, with great readiness, to give us all the information we should ask: he answered my questions and explained his proceedings in the manner of a man who was thoroughly acquainted with his subject, and had not been accustomed to follow blindly the practices he had found established. He said he was gradually renewing his vineyards, the vines having been destroyed in many places by a very destructive insect—a small white worm, with a black head, which eats into the heart of the old stock, and destroys it; vines he said, which would have been good for 150 years were thus rendered useless—they were now 40 years old; he attributed it to injudicious pruning. It was customary to cut off the bearing branch close to the old wood; by this means the worm either obtained an entrance to the heart of the stock full grown, or was deposited in the egg, on the decayed part, and worked its way in when formed. A footing once obtained, there was no mode of getting rid of it, and the consequence was that the vines became every year more injured in health, till they were at length incapable of yielding a crop. The system which Don Pedro adopted in pruning was to leave one knot of the branch cut off, which prevented the entrance of the insect into the stock.

His mode of pruning differed from what we had previously observed: instead of leaving only one, or at most two knots on each of three or four branches as was the case in the other vineyards we had examined, he left one branch with seven or eight knots, and two others with one knot each, pruning them down alternately; he did not consider that this was burthening a young and healthy vine too much. He was in the habit of manuring his vineyards, but not each year in the same place. He considered it a disadvantage to have many varieties, and was confining his new plantations

to three or four. He said that all the varieties mentioned by *Roxas Clementi* were to be found in the vineyards of Xeres, but the proprietors were all anxious to make it be believed that their vineyards contained only the most celebrated sorts. Don Pedro Domecq's vineyard contains about 200 acres, and yields from 600 to 800 butts of wine according to the season. This year a large proportion of the grapes in his vineyards, as well as in other vineyards throughout the country, had rotted, in consequence of the season having been unusually wet. He said that in future years he should take care to prevent this result, by unleafing the vines, and allowing the rays of the sun to reach the grapes. He trenched the ground to the depth of a *vara*, (33 inches;) he said he did not consider it advantageous to go very deep, it allowed the roots to penetrate too far from the heat of the air; he did not approve of the practice usual in the country of leaving holes about the foot of the vines, for the purpose of collecting the moisture to the roots; he preferred having it all well dug over; this was done three, or even four times a year, and when first dressed in the winter after the pruning, it is turned up to the depth of 14 or 15 inches.

On entering his cellar, or rather pressing-room, we found the laborers at their dinner. Bread seemed here, as elsewhere, the chief article of their diet. There was also abundance of prickly pears and grapes. We passed to the cellar where the new-made wine was stowed, and tasted it in its various states. The wine of a fortnight old was still very sweet, although the fermentation was now barely sensible. We also tasted the sweet wine of the same age, made from the *Pedro Ximenes* grape, and we conceived it to be barely possible for any thing to be more luscious, although we were informed that in a dry season it is much richer. He said he had about 200 butts of the sweet wine, and wished it were all of that quality, it was so useful in mixing with his purchased wine for exportation. We observed some casks marked *podrida*, as being made from rotten grapes, and asked if there was not great danger of that wine turning out ill. He replied yes, by the ordinary management of the country, but he had adopted a different system of treatment. He said, that instead of putting a funnel into the bunghole of the cask to prevent the scum from escaping, no sooner was the violence of the fermentation over, than he filled up the cask, in order that it might work over and escape. He also racked off his wine into clean casks at the end of two months, or even a shorter period, instead of allowing it to remain in the cask in which it was fermented till March or April, as was the general custom. He says that brandy is added to the sherry wines, chiefly on account of the taste of the English, who are its principal consumers; but it is also useful in preventing scuddiness, and curing it when it has taken place. Don Pedro perfectly agreed in an opinion which I offered, that if wines were made with sound grapes only, and more perfectly fermented, this scuddiness would never occur. I represented to him the advantage of large vats for fermenting the wine. He acknowledged the probability of a more perfect fermentation taking place in large vats, and of the wine being the earlier ready for the market in consequence; but objected, that where there were 700 or 800 butts to make, it would require so great a number of vats, that it would not be practicable. I explained to him that the fermentation would be so much sooner over in consequence of its violence, that the wine might be in general drawn off into casks after five or six days, and thus the same vats might be used many times; for in consequence of the care that is observed in the vineyards which yield sherry, to have all the grapes thoroughly ripe, the vintage will frequently continue for six weeks, commencing about the middle of September, and seldom being completed till the end of October. In the vineyards yielding the common wines this is not the case; when the majority of the grapes are ripe, they gather the whole, and their vintage, is over in 8 or 10 days. My observation, as to the shortness of the time it would be requisite to keep the wine in the vats, appeared to get over his difficulty; and from what he said, I think it likely that he will not allow another vintage to pass without giving them a trial. He said he was sensible of the advantage of *sulphuring* wine, but that it was difficult to prevent the taste from remaining: and that it sometimes happened that the English merchant would not be persuaded that there was no taste of sulphur, even when none had been used. He had got M'Culloch's book, and was aware of the qualities of the sulphate of potash, which that writer so strongly recommends. On returning from the cellar to the pressing-room we found the presses at work. There were eight troughs, similar in shape and dimensions to those formerly described, each with its wooden screw in the centre. A large quantity of grapes being heaped up in one part of the trough, they commence by strewing upon them as much powdered gypsum, or sulphate of lime, as a man can take up with both hands. A portion of the grapes are then spread over the bottom of the remainder of the trough, upon which the men jump with great violence, having wooden shoes, with nails to prevent their slipping. After the greater part of the grapes are pretty well broken, they are piled up round the screw, and a flat band, made of a kind of grass, is wound round the pile, commencing at the bottom, the broken grapes being heaped and pressed in as the band is wrapped higher and higher, till they are all compressed into it. They then commence working the screw, and the *must* flows with great rapidity. The bottoms of the troughs are elevated about 2½ feet above the floor of the cellar, and each has two spouts, under which tubs are placed, and jars in the tubs; and as the jars are filled, they are carried away and emptied into the butts. When the whole operation is completed, the bulk of the husks or skins is not more than one sixth or one seventh of what the grapes appeared when first placed in the troughs. This is almost the universal practice of the country; but some persons pour a jar of water over the grapes at the same time that they strew the gypsum upon them. And it is usual to add water to the skins and husks, and then to tread and press them again. This yields an inferior wine, but is generally added in the state of *must* to the produce of the first pressing. It has been observed, that in very dry seasons, the *agua pies*, as this is called, is almost equal to the *yemas*, or first running. Don Pedro's cellar contained eight of these presses, all of which were at work; but he was erecting a press upon scientific principles,

the plan of which he had procured from France. I did not wait to examine its construction. The vintagers brought in the grapes as they gathered them, in buckets or pails, which they carried upon their shoulders. I was astonished to observe that so little attention was paid to the quality of the grapes put into the press. I had previously observed in every mule or ass load, which I had seen conveying grapes from the vineyard towards the town, that a large proportion was decayed, but I thought it probable that some selection would be made before pressing. Here, however, I observed that three-fourths of the grapes had burst in consequence of the rain; and, perhaps, from one-third to one-half appeared to be far advanced towards *putrefaction*, but the *must* that ran from them was nevertheless perfectly sweet. Observing so little selection in a vineyard where more care was taken than in any other we had seen, and some science really indicated by the proprietor, I concluded that nothing was more common than for the grapes to be in a state of decay when the wine was made. It was evident that if baskets had been employed in which to gather the grapes, a great proportion of the juice would have been lost; but there was an immense waste of labor in each vintager bringing what he had gathered the whole way to the cellar. If Don Pedro had left roads for a cart, or even paths for a mule through his vineyard, he might have brought his grapes to the press with half the manual labor he now employs. Having an engagement to dine with Don Jacobo Gordon at 3 o'clock, we quitted Don Pedro Domecq's vineyard sooner than I would have wished to part with its intelligent proprietor. He is the largest holder of wine in Xeres, and exports more than any other merchant.

Wednesday, 5th October.—At seven this morning I took leave of my hospitable and very attentive friends at *Xeres de la Frontera*; Doctor Wilson having engaged, at the proper season, to procure and send me to London cuttings of all the varieties of vines cultivated in that neighborhood. I had engaged a *calesa*, a wretched sort of gig, to convey me to San Lucar, there to join the steamboat for Seville, this being considered my best route to Malaga, whither I now proposed to make the best of my way. We had only proceeded three or four miles, when one of the wheels became loosened, and the *calesera* had no means of repairing the damage, there was nothing, therefore, for it but to return. Accompanied by Dr. Wilson, I rode out in a different direction from any we had previously taken, and stopped to examine more particularly one of the *norias* which supply Xeres with water. We entered a stable, and ascended to the loft where the mules work; the ascent is without steps, to allow the mules to go up and down. The elevation of this loft was ten feet; the mules were not at work, and the driver lighted a piece of rope and let it down into the well to show us its depth; the well is about seven feet in diameter, and 25 varas (about 70 feet) to the water, which has a depth of 11 feet, making the whole depth of the well about 80 feet.

The circle round which the mule treads is 30 to 35 feet in diamater; the horizontal wheel is 10 feet; the verticle wheel 8. They act upon each other by a series of teeth, which are merely pegs fixed to the outside of the wheel. The teeth projecting from the horizontal wheel were ten inches; those from the vertical wheel 8 inches in length. The horizontal wheel is turned by a lever attached to the top of the beam, about 10 or 11 feet in height, and falling at an angle to the height of the shoulders of the mule. The circular bands, to which are attached the earthen jars, are made of a kind of grass which is in general use for that purpose. The jars are separate about six or seven inches, and are very deep in proportion to their width; they are fixed between the two bands, by cords passing round the middle, (where their girth is least,) and near the top; the whole length of the circular bands is, of course, twice the depth of the well, the number of the pots is 37, and they are about four feet apart. When the wheel is set in motion, they descend empty on one side, and passing through the water, rise nearly full on the other side of the well; there are small holes in the bottom of the jars, to allow the air to escape when they enter the water, there is, consequently, a constant leakage from jar to jar as they ascend. Each of the jars delivers from four to five English pints at each revolution of the wheel (of ropes.) The trough, into which they are emptied as the wheel turns, is on a level with its centre. When there is a greater demand for water in the very dry season, they double the number of pots, putting one between each of those now in use, and yoking a second mule. They must double the quantity of water delivered in the same time. The water is conveyed to the two in earthen pipes, and sold from the cistern to which it flows, the *norias* being all private property.

Having finished our examination of the *noria*, we proceeded to the adjoining vineyard, where half a dozen men were employed in gathering the grapes. This vineyard is situated in what are called the *arenas*, (sands;) the soil is a light sandy loam, and though surrounded by hills of chalk did not appear on trial to contain the smallest portion of calcareous matter.

The soil seemed capable of supporting a more vigorous vegetation than at any place he had visited, and the vines were pruned accordingly. On each vine there was at least one long branch, containing from eight to ten knots, and from two to four spurs, with one or two knots each. On some vines there were two branches, one containing eight or ten knots, the other four or five, beside three or four spurs, with one or two knots each. On one or two vines, which seemed very heavily charged, I counted twelve knots on one branch, and seven spurs; the crop was in proportion, many of the vines producing twenty bunches and upwards. The average weight of fruit on each vine could not be less than from 25 to 30 lbs. The *vinador* said, the extent of the vineyard was ten aranzadas, (9 acres, 2 roods, 10 perches;)the produce varied according to the season, from forty to fifty butts; forty-five butts is about six hundred gallons, old measure, for each English acre. The other vineyards in the arenas seemed to be pruned in the same manner, and to be fully as heavily charged with fruit. The *vinador* said the wine was of very good quality. The grapes were chiefly the variety called *Uva de Rey*; but there are also a very few of *Pedro Ximenes*, and one or two other varieties. The vines in this vineyard appeared to be in the highest state of health, and had evidently been treated with the

greatest care from the commencement. They were now twenty-five years of age; the branches were so well arranged that they balanced each other upon the stock; and few props were therefore required, the height of the stock being from 16 to 20 inches. Where, from the weight of fruit, a prop was required, it consisted of a piece of cane, with a fork cut in the end of it, and in this fork the branch rested. A small spot in the vineyard had been newly planted; he said the ground had been trenched to the depth of a *vara*, or a *vara* and a quarter. These vines were only manured once in four or five years; the reason of this, he said, was that the ground was not so *cold* as the albarizas, and did not require it oftener.

As the grapes were collected, they were spread out on large mats in the sun's rays. This is very commonly the practice in ordinary seasons; but owing to the late heavy rains coming upon the grapes when the most of them are fully ripe, they are in general hastening on the vintage this season without attending to it. The *vinador* said they would be put in the press to-night, and pressed next morning.

Mr. Cormack says, that this vineyard produces only the common wine of the country, and from the way it was cultivated he was sure it must yield 6 or 7 butts an acre, but he understood that a large portion of the grapes were sent to the market. The *arenas*, in general, he says, yield from 4 to 6 butts a Spanish acre, which is worth, on being made, about 22 *pesos* of 15 reals each. Thus, 5 butts will amount to 82½ Spanish dollars, which is equal to about £17 10s. ($83 12) per aranzada, or £18 10s. ($87 87) per English acre. This vineyard, he informed me, was worth 300 dollars per aranzada, or about £66 ($313 50) an English acre. The albariza vineyards yield, on an average, from 2½ to 3 butts per aranzada, which is worth, including the *agua pies*, this year, (October, 1831,) 38 *pesos* per butt; 2¾ butts amount, therefore, to £16 13s. 9d. ($79 32,) or about £17 10s. per English acre. Mr. Domecq's vineyard was some time ago valued at 40,000 Spanish dollars. The extent being 191 English acres, and the buildings at that time worth 3,000 or 4,000 dollars, the value of the whole will appear to be £7,756 5s., or about £40 12s. ($193 84) per English acre, the average produce being about 800 butts. This, at 38 *pesos*, will amount to £4,275 ($20,306) for the value of one year's produce of the whole, or £22 7s. ($106) per acre. The expenses of cultivation are stated by Mr. Cormack to be from 50 to 60 dollars per aranzada, and this also agrees pretty nearly with Mr. Domecq's statement. It therefore appears that the profit upon an acre of the *arenas* will be about £7 10s. ($35 62;) upon the ordinary *albariza*, £5 13s. 9d. ($27;) on Mr. Domecq's £11 7s. ($54.) I am inclined to think that this estimate is pretty correct, as it applies to the arenas, but is probably underrated in the albarizas generally, and overrated in Mr. Domecq's.

The whole extent of the Xeres' vineyards, which produce wine fit for the English market, does not exceed 7,000 acres, and about double that extent will also include those of Port Saint Mary's and San Lucar. A great portion of the wines exported to England under the name of sherry, are the growth of Malaga, and are brought round and transhipped at Cadiz. Most of the sherries sold by retail in England, under 40s. a dozen, are either of this kind or of the commonest qualities of the San Lucar and Port Saint Mary's vineyards. The whole quantity of sherry annually exported from Xeres, does not exceed 25,000 butts. In no case do the exporters send a genuine natural wine; that is, a wine as it comes from the press, without a mixture of other qualities. It is rather a singular circumstance that the sale of the produce of the common vineyards is more ready and certain than of that fit for exportation. The latter is all purchased up by a few individuals, and held by them till it is taken off by the gradual demand. The stock is equal to many years' consumption, and some of the holders are said to possess stocks to the amount of a million dollars. No wine is allowed by law to be sold for consumption till it is twelve months old. The produce of the arenas is much greater than of the albarizas, but a greater quantity of it turns sour. The very dry wine called Amontillado, is generally said to be produced in a way which no man can account for, as it is not possible to say beforehand whether the wine, when fermenting, will turn out sherry or Amontillado. If so, it is probably the result of a more perfect fermentation; indeed, Mr. Domecq agreed with me in this opinion. Rafael Torda, a Spanish writer on wines, says that it is the produce of a particular grape, the *palomina*. Although the Manzanilla and common wine of the country are more apt to turn sour than the sherry, the latter is also occasionally subject to that degeneration. Mr. Domecq said, that as many as 100 butts of the *Machar Nudo* had turned sour in one season; whether after the adoption of the plan of allowing the scum to escape during the fermentation, instead of returning it by the funnel upon the wine, I did not inquire. Perhaps it may be owing to the grapes of part of the vineyard being of an inferior quality, or there may be something in the soil or exposure which prevents their attaining perfection. Mr. Domecq said, that there are very few of the grapes which are good, even in the albariza vineyards, and that the finest sherries are produced from two or three varieties which are rather scarce; of one variety he found great difficulty in procuring cuttings, there not being more than two acres of it in the district of Xeres. Scuddiness is, however, the most prevailing defect in the sherry wines, and it is worth consideration whether this is not owing to imperfect fermentation. We tasted wine in Mr. Domecq's cellar which was quite sweet, although three weeks old. The violence of the first fermentation is suppressed by the smallness of the vessel in which it takes place; and until the original principles of the *must*, which remain undecomposed, are separated by subsequent repeated rackings, or changed, after a great length of time, into alcohol, they are always liable to rise through the wine, and produce this scuddiness. It is probable, also, that the absorption of the tartaric acid which the grape may contain, by the use of gypsum, may be a still further hinderance to the fermentation. On the whole, I think there can be no doubt that were the fermentation completed in large vessels, and the wine subsequently racked off into casks, this scuddiness would never appear; and, considering the general richness of the grapes of this country in saccharine matter, there would be as little danger of acidity if the casks

were thoroughly closed to the air when the fermentation should have ceased.

Thursday, 6th October.—This morning I again started in a calesa, and, after about four hours' travelling, accomplished the journey to the little town of *Bonanza*, above San Lucar, the distance being 4 leagues. The road was not *made* in any place, but there were bridges at spots which would be otherwise impassable. After about three or four miles' travelling, I quitted the vineyards, which for that distance crowned the chalky hills on both sides of the valley through which the road passed. The country was now open, and without a single tree or enclosure. I passed several farm steadings, if indeed they are worthy of the name. The buildings were of the most wretched description, and in the worst possible repair, contrasting, in this respect, most strongly with the cellars and pressing-houses in the vineyards, all of which were in good order, and well whitewashed. Here, however, no farmer lives upon his farm. At seed time he comes with a sufficient number of people to plough up and sow the land, and returns to the town till the season of harvest again calls him forth. The harvest is collected to a convenient spot, where the grain is trodden out by horses and cattle, and the straw is most generally burned; and this closes the labors of the year. At one place I saw seven men ploughing, each with a pair of oxen, and following each other in the same furrow. The oxen were yoked by the head, the yoke resting immediately behind the horns, and being secured round the forehead of the animals. Near Bonanza I passed several steep hills of albariza, covered with vines, and terraced on the most precipitous side.

The banks of the Gaudalquiver, for ten miles above Bonanza, are low alluvial flats, apparently of great extent; and they appeared, perhaps in consequence of the late heavy rains, too wet to bear the pasturage of cattle. From that distance the lands on both sides bore the marks of cultivation, and were covered with cattle and horses. The hills which bounded these alluvial flats were covered with olives. In several places they were gathering Indian corn and millet. On approaching Seville there was here and there a plantation of oranges. The alluvial banks had very much contracted in extent, and, though higher than those lower down the river, were in no place more than four feet above the water; but the river was very muddy, and was probably swelled in consequence of the rains.

Friday, 7th Oct., Seville.—I find that the *ordinario*, or carrier, with whom I was recommended to travel to Malaga, is not now here, and is not expected for several days. I am told on all hands, that it would be madness to attempt travelling in any other way, as the roads are so much infested with robbers, that every person who attempts to travel, unless under the protection of the *ordinario*, is sure to be stripped. The latter personage purchases immunity for himself and his passengers, by paying a sort of *blackmail* every journey. During the week which I remained at Seville, waiting for the carrier, I made two short excursions to the country. I had understood at Xeres, that the neighborhood of Seville was famous for its plantations of olives, and I was anxious, during my stay here, to learn as much as possible on that subject. My first expedition was to the ruins of an ancient Roman city, named *Italica*, which stood on the opposite side of the river, about two leagues above where Seville now stands, with the double object of visiting the ruins, and a convent of Hieronomite monks, who had extensive olive plantations, and presses for extracting the oil. I was accompanied by a gentleman belonging to an English mercantile house, to the head of which I had brought a letter of introduction. We passed one vineyard, the only one I saw within many miles of Seville; and the wine of this, the *calesera* said, was not good. We made our first visit to the convent, as it was now 11 o'clock, and the dinner hour of the monks was 12. A monk, whom we met in the outer yard, desired one of their farming men to show us the oil press—a very clumsy affair. The press consists of a beam of immense length, and not less than five cubic feet in thickness at the thickest part. The pivot or hinge, on which this lever works, is placed at about one fourth of the length of the beam from its thickest end. The long arm of the lever is pressed upwards by a screw, and the thick end is thus pressed down upon the olives which are placed under it, enclosed in a kind of mat made of grass, after having been broken in a mill. There were two of these levers in the house. The man who showed us the presses said, that a good olive tree would yield from three to four *fanegas* of olives in a good year, and that generally a *fanega* of olives would yield an arroba (about 4¼ gallons) of oil.—From the oil presses we went to the garden, where there are a few fruit trees, and where they cultivate vegetables. There was neither variety in the plants, nor taste in their distribution; but here, as elsewhere, there was a noria at work, with one ox. The water was conveyed throughout the garden by small canals. The *procurador* or steward of the convent, to whom notice had been sent by the first monk of our wish to see the premises, had returned an answer that he was occupied and could not come. We now went up to the granary, and found him employed in taking an account of a quantity of wheat which some men were conveying from one part to another. Don Peres, my companion, expressed to him my wish to see every thing that was to be seen, and particularly the oil presses. "Ah," he replied, "the English are a very ingenious people; but they already know every thing sufficiently well, and do not need to be instructed." He therefore saw us walking about the granary without stirring from his seat, or offering a single observation, and he seemed very well pleased when we took our leave. The granary contained a considerable quantity of very fair wheat, also some Indian corn and millet. I looked in vain, to discover a single weevil, and found that this insect, which occasions such ravages with us, was only known here by name. As we proceeded to Italica we found a large number of people shelling maize—the greater part belonging to the monks, who are the proprietors and farmers of most of the land surrounding their convent. Their mode of shelling was to take a blunt iron instrument (most of them used the back of a reaping hood, or the instrument with which they clean their ploughs,) and holding the cob in their left hand, with the thick end up, continue striking it till all the corn is off. Each stroke stripped the cob from top to bottom of the place where it was struck. I put the question to

several, and they said that one person would thus shell from 4 to 5 fanegas, that is, about from eight to ten bushels in a day, and that they received a rial for each fanega; that is, from the 4th to the 5th of a dollar per day; but they do not earn such wages at every kind of work. The crop of maize appeared, from the quality of the grain, to have been a fine one, and one of the persons told me that it had yielded at the rate of about 50 bushels an acre. The olives on the trees we examined, in the neighborhood of the convent, did not appear to have suffered so much as those of Xeres. The man who showed us the presses, said that there was no such thing as a failure in the crop of olives every second year. He said they had all suffered very much this year in consequence of the rains in summer, but that even this year *their* olives had not failed. On returning we struck off into a field where a lot of men and horses were employed in treading out millet. There were nine horses, and a driver to every three. They were driven round the circle all abreast; the whole superficies of a very large circle, from the centre outwards, being covered with the tops of the millet which had been cut off with very little of the straw. They had begun about mid-day and would finish at night. The produce would be about 80 fanegas —160 bushels. Many of the fields in this neighborhood are cultivated with corn crops under the olive trees, and they say that the crop is not injured by the latter. The olives are never manured unless the ground under is cultivated, and then they of course receive a share of the advantage which is intended for the corn.

Having been told by the merchant to whom I brought a letter of introduction that a Spanish nobleman, the Marquis del Arco Hermoso, had introduced the Florence mode of preparing oil, which he had learned during a residence in Tuscany, I determined on visiting his plantation, which lay beyond the town of *Alcala*, about four leagues from Seville. On this excursion I was accompanied by Don Francisco Dias, a Spanish gentleman, who spoke French, and to whom I had brought an introduction from Mr. Gordon, of Xeres. We expected to find the Marquis, who was a particular friend of Don Francisco's, at his plantation.

The town of Alcala, perhaps from its excellent situation for water mills, is almost wholly inhabited by bakers, who send their bread to Seville. At almost every door we saw the women sitting picking from the wheat the small stones, and other impurities, which it collects from their rude mode of thrashing.

The marquis had left his country house about an hour before our arrival, but we found a very intelligent peasant, who had the management of it in his absence, and who answered my questions with great readiness and intelligence. There are 200 *aranzadas* under olives, which have this year suffered much from the rain. When rain falls in August, as was the case this year, the olives always suffer from it. He estimates the present crop at about 2,000 fanegas of olives, which will yield about 1,500 arrobas of oil; but in a very favorable year the plantation will yield 5,000 fanegas of olives, or about 3,750 arrobas of oil. All the ground we saw was a very light sandy loam. It is ploughed once a year. They plough an aranzada of the olive ground in a day, but not more than half that quantity of the meadow or corn land below. There are five kinds of olives on the estate: one of them, the La Reyna, is of a very large size, and is pickled for eating. The tree of this variety produces but little fruit, and the fruit when pressed yields but little oil, but it is very highly prized for eating, being as large as a good sized plum.

The mill for grinding, or crushing the olives, consisted of a large circular stone, sloping inwards to the centre, where a sufficient space was left level for a millstone of seven feet in diameter, and 14 inches in thickness, to turn upon its edge. An upright beam, fixed to the centre of the millstone, and turning on a pivot, gave it motion. After having been brought home, the olives lie in a heap, on an average about fifteen days before they are crushed. After having been crushed, they are put into the press, and it is the common practice to pour hot water upon them, in order to extract the oil. They are pressed thrice, and each time with the addition of boiling water, there being a large boiler built into a furnace to supply the water. The fluid runs from the press to a cistern, and when it is filled, the oil flows over the top, leaving the water below, which is cleared away, as necessary. The peasant said, that all the difference between the fine and common oil was, that the former was the virgin juice, drawn off with cold water, and not mixed with the second and third pressings. The press in this cellar was of the same construction as those at the convent; it was 20 paces in length, 14 of which were on the long arm of the beam, and 6 at the short or press end. It must, from its thickness, contain many tons of timber. The oil is kept in large jars, some of which were built into a projecting part of the wall, and were sufficiently capacious to contain 100 gallons each. The fine oil produced by the Marquis is not relished by his countrymen; they say it has no taste, and prefer the rancid oil which they have been accustomed to use.

The trees on this property are reckoned very young for olives, although they are sixty years old. They are pruned every year. A man will prune half an *aranzada* in a day. But olive trees are said not to require pruning at all, till they are 25 or 30 years old. Two hundred aranzadas are equal to 191 English acres, and 3,000 arrobas of oil, the average annual produce, are equal to 12,735 English gallons, old measure, about 63¾ gallons per English acre.

I do not know, however, whether there was not included in this estimate 40 aranzadas that are entirely planted with the *La Reyna*, which are never pressed for oil. Even with this deduction the produce would fall very far short of what the trees of the Hieronomites were said to produce; namely, from three to four fanegas of olives each tree, each fanega yielding an arroba of oil. An English acre will contain 60 trees, 27 feet apart, which is about the distance they were placed from each other on the Marquis's plantations; and, indeed, 60 was said by the peasant to be the number on each aranzada. One hundred and fifty-three acres, bearing 60 trees each, will contain 9,180 trees, and the produce being 3,000 arrobas, it is scarcely one third of an arroba for each tree.

This comes nearer to Don Jacobo Gordon's statement, that from 1¼ to 1½ arroba is reckoned a good return from each tree. The trees of the

Hieronomites, as well, indeed, as the most of those I saw in the neighborhood of Xeres, were planted on a richer soil, and were of much larger dimensions; but this could never cause such a difference as to reconcile the different statements.

The principal exports from Seville are bitter and sweet oranges, and lemons. The sweet oranges are more cultivated than the bitter. I visited several plantations; one belonging to Mr. Wetherall, the merchant to whom I had brought an introduction. The plants are all raised from pips of the bitter orange, and when the stocks are four years old they bud them with two or three eyes of the sweet orange. The orange groves are reckoned of great value. The trees are planted at the distance of 21 or 22 feet each way, and, in good years, will yield from 1,000 to 1,200, or even 1,500 oranges each. They are irrigated every ten days, and the soil is disposed in small trenches to allow the water to spread. This plantation was watered by means of a steam engine, which was erected in a neighboring tan yard. Seville also exports wool and oil; but very little wool has been exported this season, in consequence of an expectation that Saxony wools would be excluded from the ports of England on account of the *cholera morbus*. Prices have risen so largely, on this account, that the merchants cannot execute the orders of their correspondents. The wools shipped from Seville are those of Estremadura, and are of inferior quality. The chief shipments of the Segovian and Leonesian fleeces are made from Bilboa. I believe no person in New South Wales was aware, at the time the prices of their wools sunk more than 50 per cent. in the English market, (4 or 5 years ago,) that the Spanish government had repealed an export duty of two rials (10 cents) on the wools of Estremadura, and three rials (15 cents) on those of Segovia and Leonesia: and thus enabled wools to be exported to a vast extent, which would never otherwise have reached the English market. About 50 vessels, of from 80 to 120 tons burthen, are annually loaded with oranges and lemons at Seville. The chief plantations are at some distance from the town. It appears to be a fruit not much used by the inhabitants themselves. There was scarcely an orange tree to be seen in private gardens, or in any of the small villages round Seville. At the present season they are gathering the *Grenadilla*, or pomegranate, which is very abundant; and this, with melons, and bread, and olives, seems to constitute, at this season, the principal fare of the common people at all times of the day.

Wednesday, 19th October.—On Thursday morning last I joined the caravan of the *ordinario*, which, on its starting, consisted of six wagons, besides a covered cart with stuffed seats and backs, called a *tertana*, in which were three friars and myself. A number of persons, on asses and on foot, also accompanied us, but these gradually dropped off as we proceeded. It took six days, including a day spent at the town of Antequera, to accomplish the journey to Malaga, a distance of 130 miles. About eight miles before reaching the former town, a party of horsemen came in sight, to the evident consternation of every one. It was said they belonged to the party of Jose Maria, a famous brigand, who has 35 men well mounted and equipped, and levies contributions on all the roads throughout the province. They did not, however, approach nearer than half a mile; and one of the muleteers having gone off to them, returned in three quarters of an hour, and said they were not robbers, but soldiers. Two miles farther on, however, we stopped at a house where we were told it was customary to make a contribution to guaranty travellers against robbers; and 14 dollars having been collected, we saw no more of the party which caused such alarm.

With little exception, the whole tract of country from Seville to Antequera is of the richest possible description, but in the most wretched state of cultivation. There are no enclosures save here and there a vineyard; and such is the state of personal insecurity, that no farmer or proprietor ventures to live on his land. The inhabitants are congregated in the towns or in miserable villages, and only visit the distant fields to give them the least possible culture, and to gather in the harvest when ripe. This being a cross-road, the inns were of the meanest description; and the fare, which was undoubtedly superior to the daily fare even of those above the rank of a peasant, was such as to indicate the greatest poverty. I did not see 100 head of cattle or twice as many sheep, during the whole journey; and only once was butcher's meat set upon the table. My companions seemed to consider themselves fortunate when the bill of fare included a stewed rabbit or hare; and this was in a country rich enough to support ten times its population, in the greatest abundance. From Antequera to Malaga, about 22 miles, the character of the country was totally different. Instead of the rich and extensive plains, bounded by gently rising hills covered with the olive, the road here wound through a continuation of steep rocks and hills, in many places approaching in character to mountains. But here the hand of industry had been at work, and, instead of a track formed by the successive marks of wheels, there was a road cut out of the sides of the hills, and winding through them with considerable art. Here and there, also, where a favourable spot was presented, a peasant had established himself; and the plantations of vines and olives, with which his industry had surrounded his habitation, had given to the narrow valleys, and steep declivities of the mountains, an appearance of cultivation and fertility that might be looked for in vain in the wide-spreading and rich valleys through which we had previously passed. As we approached Malaga these plantations became frequent, although the country only presents a succession of steep hills; the soil a loose brown loam, plentifully mixed with the gravel of the strata beneath, which is a blue or gray shale or schistus, turning brown and falling to pieces on exposure to the atmosphere. In many places, as appeared at the sides of the road, there were five or six feet in depth of this loose soil, before it came upon the more solid material. It was evident the vines had been planted without the ground having undergone any previous preparation; and no provision was made, even in the steepest places, to prevent the soil from being washed away. The vines, in general, seemed to be treated in a very slovenly manner; the stock was close to the ground; and numerous weak shoots were springing out in every direction.

It was seven in the evening when we entered Malaga, having been travelling from three o'clock in the morning, at which time we started by torch

light. During the whole of this time the mules had no food, and only one hour's rest, which was afforded them by the overturning of a wagon, and yet they came into Malaga without any symptoms of fatigue.

After enjoying a comfortable night's rest, I proceeded to deliver my letters of introduction. One of these was to Mr. Kirkpatrick, the Hanoverian consul, a Scotchman by birth, who had resided 40 years in Spain, and whose kindness to travellers is proverbial. I found that the season for preserving raisins had been over for some time; Mr. Kirkpatrick, however, lost no time in ascertaining what information could yet be procured.

Friday, 21*st October*.—At day-break this morning, a gentleman, whom Mr. Kirkpatrick requested to show me his vineyard and explain the process of preserving the grapes waited upon me, and we set out immediately. Our road, lay along the shore, to the eastward, the vineyard of Don Salvador Solier lying in that direction, at the distance of about 14 miles. In the immediate vicinity of Malaga the country is extremely rugged, but every patch where it was possible to thrust in a plant was under cultivation. The rocks consisted of rugged masses of limestone, alternating with the same kind of slaty schist I had previously observed on the road from Antequera. For the first two leagues there were few vineyards, chiefly owing to the ruggedness of the country, which would not admit of cultivation. Beyond that distance almost every hill was covered with vines, the produce of which is all converted into raisins. The grapes are all of the large white Muscatel—the *Muscatel Gordon* of *Roxas Clemente*. This grape, my companion informed me, does not succeed in the interior, and therefore all the Muscatel raisins are made within two leagues of the coast. The Lexia raisins, which are used for puddings, &c., are made in the interior. We arrived at the country house of Don Salvador at nine o'clock, and, after a substantial breakfast, sallied out to examine the vines. Six or seven workmen were employed in preparing the ground for planting, within a short distance of the house. They did not trench the whole of the ground, but dug out square holes about two feet in diameter, and not more than 20 inches in depth. The distance of the centres of these holes from each other is seven feet, and this is the distance at which the vines on the hills round Malaga seem invariably to be planted. The vineyard I was examining, as well as all those in its vicinity, consisted of a series of steep hills. The soil every where was a decomposed slate, mixed with abundance of gravel of the same substance. On the higher part of the ground this soil appeared rather hard, and required great labor to break it up, but once broken up it is loose for ever; so much so, that it slides away from under the feet even where there is only a slight slope. There is no difference made in the distance at which the vines are planted, between the hills and the valleys: although in many places, on the former, the shoots scarcely extended more than 10 or 12 inches, while in the valleys they extend to the length of as many feet. They never, under any circumstances, manure these vineyards; they say it would give more wood, but would not add to the quantity of the fruit. The branches are pruned closer to the stock than those of any vines I ever saw; nothing but the half-formed buds, at the junction of the old and new wood, being left to produce the wood of the succeeding year. I could not find an instance where the spur had been left long enough to include the first full-formed bud, which is generally from half an inch to an inch from the junction. The number of shoots seemed almost unlimited; I counted from 10 to 22; there was scarcely any vine had fewer than 10, and they generally had from 12 to 15. The stock was close to the ground, and not the slightest effort made to raise the shoots, or support them from the ground. Almost every bunch would therefore lie on the ground; and, were the soil of a less gravelly description, the greater part would without doubt be lost. After the pruning, they dig over the ground and lay bare the stocks, in order to scrape off the *barbe*, or small thread-like roots which are near the surface. As scarcely any grass or herb vegetates among these vines, and the soil is always sufficiently loose, it is evident that they require little digging or cleaning. We went out to visit a peasant, a neighbor of Don Salvador's. He said four or five very fine vines might yield raisins enough to fill a box which contains an *arroba* of 25 lbs.; but throughout the country it would require, on an average, nine or ten. The grapes lose about two thirds of their weight in drying: this would, therefore, give a produce of 7 or 8 lbs. of grapes to each vine—a calculation which I should think must include a much greater proportion of stinted vines than of luxuriant ones; for the majority of those in Don Salvador's vineyard would, I have no doubt, yield double that quantity. Including, however, those vines which are visible at the tops even of the highest hills, the calculation is likely enough to be correct. The peasant whom we visited was making wine from some of his grapes, which, after having been nearly dried, were spoiled by the rain. In a small skilling, behind the cottage, a portion of the floor, about ten feet square, was elevated above the rest. It was paved with tiles, and a man was busy trampling the raisins, which he had almost reduced to a paste. He heaped them into a corner as he successively passed them under his feet for the press, which was merely a large beam passing along the skilling, without any screw, or any other means of giving it additional power as a lever. A little water was added to the grapes to bring out the juice, and a part of the *must* was on the fire boiling, to add to its strength. We tasted some wine made two months before from the *Pedro Ximenes* grape, and also some from that grape mixed with the Muscatel; both were as sweet and luscious as possible. The grapes, when dried, are worth double what they would yield made into wine, and therefore they are never made into wine unless spoiled by the rain.

They usually commence gathering the grapes about the middle of August, choosing only such bunches as are ripe. They return, after a week or two, to make another selection, and so on for a third and fourth time. A place is always reserved in the vineyard, free from plants, on which to spread the grapes when gathered; and they choose a spot where the soil is of the darkest color, in order to its keeping the full force of the sun's rays during the day, and retaining the heat during the night. The bunches are spread out separately on the ground, and never allowed to press upon each other:—according to Don Salvador they are

only once turned over. At the end of 15 days they are, in general, sufficiently dry. This season was more unfortunate for the early commencement of the rains than any season for many years, and the crop was remarkably fine. It is Don Salvador's intention, in future years, to have wooden *toldos*, or awnings, prepared to shelter the grapes, while drying, against the rains, and also to cover them during the night. He says that the drying of the grapes is so much retarded by their being exposed to the dews during the night, that when he has the means of covering them at night, he expects they will be dried in half the time usual at present. Before the bunches are spread out, the small grapes are picked out, as well as any which may happen to be injured: the small grapes are dried separately. I saw a heap of them in Don Salvador's house, which had the appearance of very large currants. When the grapes are turned, any spoiled ones are, or ought to be, picked out; they have no particular rule for judging when they are sufficiently dry,—it is learned by experience. When they happen to get rain while drying, the stalks become black or rusty-looking, instead of being of a bright light brown. According to Don Salvador, the district which produces the Muscatel grape extends only two leagues farther east; that is, not more than three leagues in all, along the coast, and two leagues inwards. He says the value of the land planted with it is about 3,000 rials, or 150 Spanish dollars per *fanega*. There is a piece of land, adjoining their own, which they are anxious to buy; they would give for it 1,500 rials per *fanega*—to plant it with vines would cost 500 rials more, and there would be no return for three years. Each *fanega*, he says, contains 650 stocks, and as each stock is seven feet apart from its neighbors, the number of square feet in a *fanega* will be 31,850, which is 2 roods 37 perches English measure. It required, he said, ten men for a day to hole a *fanega* for the plantation. If, therefore, 10 stocks give 25 lbs. of raisins, a *fanega* will give 1,625 lbs., or 65 *arrobas* or boxes of 25 lbs. each; which would be, for an English acre, 2,222 lbs. Don Salvador pays his workmen 3½ rials, about 17½ cts. a day, besides food. The food consists of, in the morning, a soup of lentils, &c.; at dinner, pork; and at supper, the *aspachio*, or cold soup, formerly described, bread and grapes at discretion. The whole costs about 5¼ rials, or 26 cents a day.

Saturday, 22*nd October*.—Having read over to Mr. Kirkpatrick my notes of yesterday's excursion, he said that Don Salvador's information was generally correct, but added the following observations:—The Muscatel grape, Mr. Kirkpatrick thinks, must be cultivated as much as four leagues from the coast, but will not succeed beyond that distance. The extent of coast which admits of its cultivation must also be five or six leagues, at least, as the principal cultivation is in the neighborhood of Velez Malaga, five leagues to the eastward of Malaga.—There are three distinct sorts of raisins:—1st, the Muscatel, which are the finest, and are always packed in boxes of 25 lbs., and half and quarter boxes, containing, respectively, the half and quarter of that quantity.—2dly, Sun or Bloom raisins: these are prepared in a manner in every respect similar to the Muscatel, but from a different grape; a very long grape called in the country Uva Larga. These are also generally packed in boxes, but sometimes in casks. Those in boxes are also called *bunch raisins;* the others are generally of an inferior quality, and separate from the stalks. The sun or bloom raisins keep better than the Muscatel, and for that reason, it is this description which is usually sent to India. 3dly, the Lexia raisins, which are packed in casks, or grass mats called *frails*. These raisins are of an inferior kind, and require to be dipped in a lie (*Lexia*) of wood ashes, with a little oil, before drying.

Muscatel raisins are worth to the grower from 30 to 40 rials a box, according to the season. This year as much as 52 rials was given for some that, with the aid of *toldos*, had been preserved without having been touched by the rain. When Muscatels are 40 rials, or 2 dollars a box of 25 lbs., Blooms are about 30 rials, and Lexia only from 24 to 28 rials per quintal of 100 lbs. Mr. Kirkpatrick says, that 12 English acres make 13 fanegas. According to this calculation, an acre will produce, at 2½ lbs. to each stock, 1,760 lbs.; which, at 40 rials the box, or 4d. (8 cents) a pound, are worth £29 7s., ($140,) at 30 rials £22, ($104 50) an acre. From this must, however, be deducted the expense of 70 boxes, at 4 rials each, which amounts to £2 17s. 6d. Still, it seems a most profitable cultivation; so much so, that I incline to think the quantity is less than that estimated. The expenses of cultivation cannot exceed £5 or £6 ($24 to $29) an acre. The following accounts of the exportation of fruits from Malaga were taken from detailed statements which had been copied from the custom house cockets, and were kept in the office of Mr. Kirkpatrick.*

The boxes are partly *Bloom* or *Sun raisins*, but principally *Muscatel*. The barrels and frails are chiefly *Lexias*.

In the spring, shipments are made for the Baltic, and small parcels are sent, at all times, in assorted cargoes. On the whole, Mr. Kirkpatrick is of opinion, that from 20 to 25 per cent. may be added to the shipments of the fruit season, to make up the whole export from Malaga. This would make the whole weight of raisins annually exported from Malaga from 4,000 to 4,500 tons. The almonds shipped from Malaga are of the kind called Jordan; and these, as well as the Muscatel raisin, will only grow in a very limited district. Mr. Kirkpatrick has this day about 100 women shelling almonds in his yard. This costs three rials a fanega, which yields from 20 to 22 lbs. of shelled almonds. A fanega is the produce of about four trees. The grower gets from three to four dollars for a fanega. The women break each almond separately, laying it on a small anvil, and striking it with a small iron rod; others pick them out from the shells on a table. The confectioners purchase the shells for their fires, and they almost pay the expense of shelling. Such is the superior value of the Jordan almond, that the duty upon them in England is £4 15s. per cwt., which is double that upon the common sorts. The Jordan almond is distinguished in appearance from the common, or Valencia almond, by its greater length.

Monday, 24*th October*.—I this day visited the stores of Messrs. Rein and Company, the first mercantile house in Malaga. They were receiving, in one store, Lexia raisins from the country.

* See next page.

ACCOUNT OF FRUITS EXPORTED FROM MALAGA.

	COUNTRIES TO WHICH EXPORTED.	No. of Vessels.	RAISINS.			ALMONDS.			FIGS.	GRAPES.	LEMONS.	ORANGES	POMEGRANATES.
			Boxes of 25 lbs. each.	*Barls. of 100 lbs. each.*	*Frails of 56 lbs. each.*	*Boxes of 28 lbs. each.*	*Barls. of 100 to 300 lbs. each.*	*Frails of 100 lbs. each in shell.*	*Cases, barls. and frails, 56 lbs. each.*	*Jars, 36 to 40 lbs. each.*	*Cases of 1000 lemons.*	*Cases of 1000 Oranges.*	
Year 1828, from 1st Sept. to 31st Oct.	England	58	83,410	11,624	4503	6775	1017	8	2162	14,573	4984	321	165
	France	11	21,156	1479			3		2027	25	787	41	
	Holland	8	901	3906						20	1649	78	
	Bremen	2	300	1326					40	50	170		
	Hamburgh	8	2051	4825			15		565	442	2080	25	
	Copenhagen	4	400	3180	380				430	425	660	88	
	Petersburgh	3	950							1400	420		
	United States	13	39,424	7604		91		595	1680	1430	418		
	Totals	107	148,592	33,944	4883	6866	1035	603	6904	18,365	11,168	553	165
Year 1829, from 3d Sept. to 30th Oct.	England	41	52,909	6004	612	2546	535	10	1955	10,862	3942	202	30
	France	14	31,859	1970			60		1105	48	1275	24	
	Holland	9	17,627	4810	50				362	34	1845	54	
	Bremen	1	280	720.						33	110		
	Hamburgh	12	6318	3571				50	1230	578	3083	65	
	Copenhagen	6	827	4795			5		831	407	1114	10	
	Petersburgh	2	500							1400	450		
	United States	24	89,840	11,379		404	62	1501	3494	4921	2169		550
	Totals	109	200,160	33,249	662	2950	662	1561	8977	18,283	13,988	355	580
Year 1830, from 24th Aug. to 27th Oct.	England	36	45,582	3219	2319	2987	885	4	962	11,105	3938	203	
	France	11	17,487	1486					200	6	115	60	
	Holland	8	9170	1773					1018	97	1649	154	
	United States	30	127,683	17,778		405	16	608	355	5673	2982		
	Bremen	2	510	317						78	189		
	Hamburgh	12	9227	994			4		263	724	3277	79	
	Copenhagen	5	650	2902			13		625	370	785		
	Stettin	2	107	600						49	240		
	Petersburgh	3	500							2070	840	10	
	Leghorn	2	4000										
	Genoa	1	2000						20				
	Totals	112	216,916	29,069	2319	3392	918	612	3443	20,172	14,015	506	

PRUNES.

The grower, in the beginning of the season, got ten rials the arroba, of 25 lbs.; the price is now only seven. The quality this season is very bad; many of the raisins appeared bruised and burst by the rain. Ten rials the arroba amounts to two dollars per quintal of 100 pounds—one penny per pound. A peasant, who had come with the fruit, said they would get from ten to twelve quintals from a fanega. The persons in the office seemed to think, that, either from ignorance or intention, he understated the quantity. This would only be twenty-two dollars for a fanega.

Mr. Delius, the clerk of the fruit department, said, he thought the estimate of 1,625 pounds of Muscatels from a fanega, was likely to be correct. They usually, he said, expected 60 arrobas—that is, 1,500 pounds, in a good season; from 50 to 60 arrobas was the average. In the neighborhood of Messrs. Rein's stores they were packing lemons. The grower gets seven dollars for a case containing 1,000:—the largest are sent to England. They are each put into a piece of paper by women, who get through the work very rapidly; they are employed by the day, and get five rials, about one shilling, for their work. The green grapes sent to England are packed in oak saw-dust, which is imported from England for that purpose; no other kind will answer. It is a coarse fleshy grape called Loja, from the place where it is cultivated; it keeps till April and May. There is a large black grape very abundant in the markets at present, and also a large green grape, neither of which is distinguished for flavor; they are sold at four *quartos*, about one penny, a pound.

The house of Rein and Company have extensive sugar plantations at Almunecar, about 30 or 40 miles east of Malaga. I had determined to accompany Mr. Delius, a member of the house, to visit these plantations, in which I felt a great degree of interest, as I was confident, that if sugar could be cultivated here, it ought to succeed at Port Macquerie. An opportunity of a vessel for Marseilles having, however, presented itself in the mean time, I resolved on taking my passage by her. I procured from Mr. Delius the following information respecting the sugar plantations. Sugar has been cultivated in this part of Spain for nearly 100 years, but never to any very great extent. The plantations at present are more extensive than they have ever been before. The whole produce does not, however, exceed 20,000 quintals, of which 5,000 are produced by their house; 20,000 quintals, of 100 pounds each, are 894 tons. Rein and Compay's own plantations are not very extensive, but they have erected a mill and distillery. They receive from the planters the cane, and return them one half of the manufactured article. Four or five kinds of cane have been cultivated, but they are now confining their attention to the large Otaheite cane, finding it succeed better, and yield a better return. The soil is in general of a loose sandy quality, but very rich, and is also richly manured.

The planting takes place in May, and the canes are cut in February following. The same stools will last for six years. They are cut down to 10 inches from the surface. Six plants are put into one hole, and the holes are not more than three feet apart, so that it is impossible to enter the plantation after the canes have got to a certain height. The ground is cultivated by ploughs with oxen, but of course only when the canes are very young, or in the early part of the season. The cane grows to the thickness of a man's arm and from 18 to 20 feet high. Mr. Delius has seen fifteen feet of ripe cane. A fanega of rich land will yield from 45 to 50 quintals, that is, from 4,500 to 5,000 pounds of sugar. They have a refinery on the spot. This year their sugar brought 10 per cent. higher than imported sugar; and their rum promises, when old, to be equal to that of the West Indies. It is now two years old; but as they consider that the rum hitherto made has failed to come into use, from having been sold to the consumer too early, they intend to hold it for two years longer. The frost sometimes injures the sugar cane a little, but frost seldom occurs. Twice during 20 years Mr. Delius has observed it of the thickness of a dollar in the night. The ordinary range of the thermometer, during the day, in the winter months, is 56 to 58; in May and June, 72 to 75; in July and August, 78 to 82 or 83, except when one or twice during the season, it blows over the land, when it rises to 100. The temperature of the atmosphere along the coast is exceedingly equable. During 20 years Mr. Delius never observed the barometer vary more than an inch; its range is between 29½ and 30½. The sugar cane will not grow except within five miles of the coast. Beyond that distance the frost is greater, and the weather more unsettled. The land planted with sugar cane is irrigated twice or thrice when the shoots are very young, but Mr. Delius thinks not afterwards. All the plantations command the means of irrigation.

With reference to the value of vineyards, a friend of Mr. Kirkpatrick's gave me the following information: He purchased an estate five years ago. It is situated about two leagues from Malaga, and is all mountain. Vineyards are valued by the number of stocks. An *abrado* contains 1,000 stocks; this, at seven feet distance, gives 180 perches, or one acre and 20 perches, as the extent of an abrado. In this estate there were 80 abrados, or 90 acres, planted with vines, which were in very bad order. Also about 150 acres more, which were not planted, and were considered of very little value. The price was 5,000 dollars, about £1,050, nearly £12 an acre for the vines, counting the remainder as nothing. The produce was very little the first four years; last year 600 arrobas, this year 1,000 and if the next season be favorable, it will produce 1,500 arrobas. The new wine, as soon as the fermentation is over, is worth from nine to ten rials an arroba; 1,500 arrobas are equal to about 4,500 gallons which is only 50 gallons an acre, and at the highest price only eight dollars and one third per acre. This is so poor a return, both in quantity and value, that it is probable the vineyard is still far from having been brought into full bearing, and that the 150 acres must have been considered worth a considerable part of the price, notwithstanding its depreciation.

The produce of the vineyards round Malaga, which is not converted into raisins, is now chiefly a dry wine. It is similar to sherry, but very inferior in flavor, and is chiefly taken off by the Americans. The demand from America has greatly increased since the general establishment of temperance societies in that country. This wine retains a sweet taste till it is two years old. The

Old mountain, or *Malaga* sweet wine, which was formerly so much in demand, is now almost out of fashion throughout the world, and is very little made. It was formerly the chief export from Malaga.

Friday, 28th October.—Having been introduced to Mr. Bryan, a gentleman of Irish extraction, and brother-in-law to Mr. Heredia, one of the principal merchants in Malaga, I went with him to visit the cellars of the latter. There is no such wine as Malvasia, which is said, in the *Topographie des Vignobles*, to be produced at Malaga. The Muscat wine is very scarce, the raisins being so much more profitable. They make a white sweet wine with the Pedro Ximenes, and a small portion of the Muscat wine added to it, to give it the flavor of Muscat wine. The sole difference between this wine and the Mountain, is that the latter is mixed with a portion of *must*, which has been boiled down to one third; this also gives it the brown color. Mr. Bryan says, that within the last two years there has been a great demand for sweet wines from the United States. Most of the wines this year were, therefore made sweet, and the farmers are getting a better price. The new wine is this year worth to the grower twelve rials the arroba. The difference in the making between the sweet wine and the dry is, that when the grapes are intended for the former they are spread out for three or four days in the sun. The new wine, when sweet is worth a third more than when dry. An abrado of 1,000 stocks, even in the mountains, Mr. Bryan said, will sometimes yield three or four butts of wine. Mr. Heredia has lately purchased a vineyard of 400 abrados, which they are now improving. In one or two years more they expect it will yield 1,000 butts of wine annually. Mr. Bryan thinks it may contain 500,000 stocks; he says the varieties of vines chiefly cultivated, are the Pedro Ximenes and the Doradillo. Both the dry and the sweet wines are made from them, the difference being only in the management. In Mr. Heredia's vineyard, which is situated to the north of Malaga, near the top of the mountain, there are fifteen varieties of wine; but by far the greater portion consists of two varieties already mentioned. The system of pruning in the neighborhood of Malaga has hitherto, Mr. Bryan says, been very bad, it having been the universal practice to leave a spur on every shoot, weak or strong, and no care was taken to keep them from the ground. Since their house became such extensive proprietors of vines they have procured men from *Xeres de la Frontera* to prune the vines, according to the system pursued at the latter place; but they find great difficulty in getting their own people to follow the example set. Mr. Bryan pressed me very much to visit with him their vineyard, which they were now pruning, the leaves having fallen, in consequence of the difference of temperature at that elevation, although near Malaga they were still perfectly fresh; he promised to send to Mr. Kirkpatrick an assortment of cuttings of every variety in the vineyard; and on the other hand he requested me to purchase all the publications which have lately appeared in France, on subjects connected with vine growing, and forward any information which might strike me as particularly valuable to them. This, he says, may save him the trouble of a trip of France, which he was contemplating.

Mr. Bryan disapproves of the system pursued in Xeres, of leaving a void of one fifteenth part in each cask, with the bung loose to admit the air. He refers to Dr. Ure's Chemistry as an authority against this practice. It seldom happens, however, that sherry wines thus exposed turn sour in consequence, although this would inevitably happen with wines of less body.

The farmers in the neighborhood of Malaga do not, like those of Xeres, hold their wine twelve months before selling it to the merchant. They have earthen vats, of the shape of an urn, and sometimes large enough to contain two or three butts. Into these vats the *must* flows as it is pressed; and as they become full, in order to make room for more, the wine is conveyed from them, more or less fermented, as it may happen, to the stores of the merchant. Their means of conveyance are mules and asses, the wine being carried in sheep skins; these skins, from being constantly used, do not, however, give any taste to the wine. No difference seems to be made in price in consequence of any real or supposed difference in quality; and the culture of the vine, excepting that of the Muscatel for raisins, seems to be a very poor pursuit.

Messrs. Heredia and Co. sent a quantity of wine to America without brandy, and it was much liked, and considered to bear a resemblance to Champagne. I also tasted wine of a year old, which he said resembled what had been sent. It was very deficient in flavor, but promised to be a wine of a good body when older. I also tasted some wine which had been sent to Havana for the voyage, but it seemed to me to be exceedingly vapid and flavorless. Mr. Bryan complained of the presence of tartaric acid in their wines, which gives it, when new, a harsh taste. It appeared to me that this acid was rather deficient than in excess, and I told him I thought their wines would have more character if fermented with the husks, and, perhaps, even a part of the stalks. I think their vapid taste, or *fadeur*, to use a French expression, is chiefly owing to the *must* containing only the purest principles of the grape. A more violent fermentation, produced by a larger quantity being fermented in a mass, would, on the other hand, make the wine ripen as early as at present, notwithstanding the addition of these other principles. Indeed, there can be little doubt, that by allowing a large portion of tartaric acid to mingle in the *must* with the husks and stalks, a perfect fermentation would be much earlier effected.

The best wine in Mr. Heredia's cellars falls far short of a good sherry. They have not yet adopted the system of having soleras, which are never exhausted. But Mr. Bryan says, their attention has been so largely devoted to other pursuits, that hitherto they have not paid so much attention to their wines as they will do now that they have embarked so largely in the business.

In the evening I accepted an invitation from an old Irish merchant, who has been settled in Malaga for forty years, (Don Juan Langan,) to visit his cellars. He has been in the habit of sending choice wines to England and Ireland, and particularly of supplying the cellars of noblemen, and men of great wealth. Although his stock is not very large, he has dicidedly the best wines I have tasted in Malaga; that is, dry wines. Some of them, he says are twenty years old and upwards.

Some of his wines of seven or eight years old resembled a good sherry, and he agreed with me in thinking that his sweet wine of that age was equal to those three times as old. He further agreed with me, that the great age of those wines did by no means add proportionably to their quality; and he evidently understands the art of giving the qualities generally attributed to age, by mixing, and other management. He himself hinted at the success with which he had conducted this branch of trade, and he has the reputation of having acquired great wealth.

In the evening I for the last time took leave of my kind and worthy friend, Mr. Kirkpatrick, and embarked on board the French schooner, in which I had engaged my passage to Marseilles. I left with Mr. Kirkpatrick the following memorandum: "a box three feet long, by two feet deep, and two feet wide, will contain nearly 500 cuttings of vines, each the full length of the box. The book called *Conversaciones Malaguenas* contains a list of the varieties cultivated in the neighborhood of Malaga. Perhaps there are some new varieties which were not known when it was published. About thirty varieties are there enumerated. This would allow of thirteen or fourteen cuttings of each kind to be sent; but it is not likely that it will be possible to procure cuttings of every kind; there will, therefore, be room in the box to send a greater quantity of the most valuable; for example the Muscatel (the Larga, or long grape, which yields the bloom raisins) and the Pedro Ximenes; six or eight cuttings of each would be enough of the less esteemed varieties. It will be observed that there are two kinds of the Muscatel; the smaller may be undervalued in this country, but it may suit our climate better than the other. Mr. Delius mentioned a vine which had produced bunches weighing fifty pounds. Perhaps it would be possible to obtain cuttings of this kind, perhaps of the identical vine. I should not like the little Corinth grape to be forgotten. A cutting should be taken from the lowest part of the shoot, as near to the stock as possible, the top part of the branch being cut away. Those are the best which contain the greatest number of knots or buds; a string to be tied round each variety, and a small piece of wood tied to the string numbered, so as to correspond with the number in the list and description.

"Besides the number in the book, and color of the grape, it would be desirable that the name most commonly given in the country should be stated; also, whether it is most esteemed for raisins or for wine; whether used for sweet or dry wines; whether a great bearer or otherwise; whether it ripens early or late; whether cultivated in the vineyards, or the gardens, and any other particulars which may distinguish it. The cuttings will pack better if procured as strait as possible. Should it be found that there is not room to send six or eight cuttings of the least esteemed varieties, let the number be diminished to four or five; but, under any circumstances, I should not like fewer than from twenty to thirty each of the Muscatel, Bloom, and Pedro Ximenes.

"The interstices formed by the cuttings to be filled up with sand and very dry soil. Two boxes of the above description to be prepared, one to be sent by the first vessel which sails after the vines can be cut with safety, which undoubtedly may be done about the 1st of December, the duplicate by the next vessel that may follow, both addressed to Messrs. Walker, London, who will pay all expenses which may have been incurred up to the arrival of the boxes in London, and will send them to New South Wales by different ships, and by the earliest opportunities. Perhaps, in addition to the above, Mr. Kirkpatrick will take the trouble to procure a quantity, say a gallon, of the freshest *royal* dates of Barbary; also a few of the common varieties, and a gallon of Jordan almonds, and send them in a box to the same address. Also in the same box a few seeds of the very fine onion, which is so abundant in Malaga, and of any esteemed kind of melons, or any other fruit or vegetable grown from seed which may be considered worth attention. After my arrival in London I shall ascertain what are the best seasons and modes of sending plants of the Spanish chestnut and Jordan almond, and I will take the liberty to write Mr. Kirkpatrick upon the subject, satisfied, as I cannot but feel, that he will esteem it rather a pleasure than a trouble to contribute to the advancement of a colony containing so large a proportion of his countrymen as New South Wales."

During my stay in Malaga I also wrote to my friend Dr. Wilson a letter, which contained the following observations and queries relative to Sherry wines:—

* * "I have been thinking a good deal about the Sherry wines, and there are some points on which I have not been able to satisfy myself. You know we no sooner had the practice of returning the scum upon the wine, by means of a funnel, pointed out to us by Mr. Domecq, than we condemned it. It has occurred to me, that after all, it may in most cases be the best thing they could do. It is the saccharine principle that is undoubtedly most abundant in the grapes of these climates, and the imperfect fermentation which takes place in a butt, may require to be carried forward by the addition of the yeast, which, were it not for the funnel, would escape. I think Cormack used the expression, that it was to feed the wine that the scum was returned. In this I have no doubt he was correct. On the other hand, it seems to be agreed that a good deal of the Sherry even of the albarizas, turns sour. This might undoubtedly be prevented by a contrary arrangement to the above. I think Domecq said, that sometimes 100 butts of the Machar Nudo wine would turn sour in one season. I wish you would ask him whether there has been an instance of any of his wine turning sour since he adopted the practice of allowing the scum to escape. Perhaps there are particular kinds of grapes in the vineyard which yield a wine without body. Perhaps particular parts of the soil do not bring the grapes to perfection. You will see from Chaptal what a difference there frequently exists in France in the value of the produce of two sides of the same hill. It was a question I always forgot, or neglected to put, at Xeres, whether the difference of exposure was found to affect the quality of the wine. I suspect all these things have been overlooked.

"When I saw the state of the grapes which Domecq was pressing, and which seemed, in fact, no worse than others we saw in all directions, I thought it was easy to account for the scuddiness which so generally attacks Sherry wines. Cassabon's overseer, however, afterwards showed us, that however broken or rotten in appearance, the

grapes were by no means in reality decayed. This shook my faith in scuddiness being the result of the employment of decayed grapes. On the whole I think if a more perfect fermentation were effected in the first instance, little scuddiness would ever afterwards be found in the wine. I think you will find in Chaptal, that the *graisse*, which I take to be the same thing, most frequently shows itself in wines which have undergone little fermentation; that is, where, in order to preserve the *bouquet*, the fermentation is stopped. He says elsewhere also, that it had been usual at Orleans to ferment the *must* with stalks and skins and all. At one time, however, they thought of relieving their wine of a degree of harshness, by not suffering the stalks to be fermented, but it was found that the wine was much more subject to *graisse*, and they returned to their old practice. He says, that in various parts of France they deprive the grapes, i. e. the *must*, more or less of the stalks, according as the season has been favorable or otherwise for maturing the grapes. In a very fine season they leave all the stalks, considering it necessary to produce a perfect fermentation. In no part of Spain, as far as I can find, do they ferment even the skins of the grapes.* Were I concerned in the business I should certainly attach much importance to, and expect important results from, a trial of the system of large vats, and the fermentation of the skins in order at once to effect a thorough fermentation. In most cases I think you would have an Amontillado; that is, if you allowed the grapes to be as ripe as they are allowed to be at present, dried them in the sun, and assisted their natural dryness still further by adding gypsum. (By-the-by, may the gypsum not contribute, by absorbing the existing acid, to produce scuddiness?) But if, as is the practice at San Lucar, you make the vintage before all the grapes should attain the perfect ripeness they do at present, and were less particular in depriving them of moisture, then I think you would have a wine something between the Manzanilla and the Amontillado; not so dry as the latter, but adding much of the mellowness and richness of Sherry to the lightness of the Manzanilla. The latter is, in fact, the natural wine of the country on the ordinary soils. If the produce of the albarizas were treated in the same manner, you would have a wine of the same character, but probably surpassing it in quality as much as the real wines of the Chateau Margaux and Haut Brion surpass the ordinary growths of Claret. Add to this what I cannot but think would be a certain, and to the merchant the most important result, you would have a wine as ripe in eighteen months as it now is in three or four years. There are two or three other little points, about which I should like to inquire. Domecq said, a number of his grapes had rotted this year, in consequence of the wet weather and luxuriant vegetation. This he would prevent in similar seasons in future, by stripping off the leaves to give the grapes sun and air. Pray is this practice not generally known in the country? In the south of France it is a regular part of the labors of the vineyard, unless in remarkably dry seasons. Another query is, do they never take the top off the branch after the grapes are formed?—I should like to know Pedro Domecq's ideas about the agua pies. In many seasons, Cormack says, the agua pies is better than the first pressing,—now this can only be owing to the over-ripeness of the grape—to its containing too much saccharine matter in proportion to its moisture. Would it not be better to make the vintage earlier? and, instead of adding foreign moisture, you would then have enough of the natural juice of the fruit, and enough also of saccharine matter, seeing its excess is the most general fault. But this would not suit the hot mouths of your English customers. If you have an opportunity, give me some particulars of the relative value of the albarizas and arenas. I am confident Cormack must be mistaken. I think it is barely possible but that the albarizas must be double, if not treble, the value of the others."

Thursday, 10th November.—After encountering a succession of contrary winds and calms, we this day came to an anchor in the bay of Rosas, in Catalonia, the north wind blowing so strongly out of the Gulf of Lyons, that it was impossible to double Cape Creux. I was now on the verge of one of the most interesting wine countries in France, and was glad of this opportunity of quitting the vessel before her arrival at her destination. But on touching the beach we were informed that we must be put under quarantine, owing to a report that the yellow fever had broken out at Gibraltar.

Rosas, like most of the other towns I have seen on the east coast of Spain, is backed by steep hills, which are clothed with vines and olives to the very tops. In the distance are the Pyrenees, capped with snow. If one might judge from the state of these hills, contrasted with that of the rich plains of Andalusia, we might draw the conclusion, that wherever nature had been bountiful, man had been indolent; but where she had been niggardly in her gifts, the deficiency had been more than compensated by the industry of man. The hills above Rosas, as well as those in the south, exhibit every where an appearance of the most careful cultivation, and in general are covered with habitations, while it was rare that a detached house was met with for many miles on the plains.

(To be continued.)

*The red wines of Catalonia, and of other provinces which produce red wine, are of course an exception to this observation, as it is necessary to ferment the skins in order to give the wine a color.

INSECTS. INDIAN CORN. MILLET.

For the Farmers' Register.

I have noticed, in a late Register, that one who is known to be a good farmer, and intelligent, has determined to graze his lands for the purpose of destroying insects; will he permit me to inform him that this course will not answer his purpose. A few years past I grazed my lands very close, and cropped them severely; nevertheless, the insects increased so rapidly that with a microscope I could see on a small space thousands, of perhaps all shapes and colors. My corn has been more damaged by insects than other crops, but all have suffered; so that I have had at least an acre in a body, without a productive stalk standing. At my place of residence I now graze my fields very lightly; indeed some are not grazed at all, except in winter and early spring; yet my crops

are generally not sensibly affected by insects. I discover no damage this year amongst my crops, except my rye; and the failure of this I do not attribute to insects, but a peculiar state of the atmosphere.

I attribute my success to the almost incessant motion of the plough and harrow. Indeed, when I view my crops, and reflect that about twelve years past my grounds yielded to the acre only about 12 bushels of corn, 8 bushels of oats, and less of wheat or rye, and that crops are harvested from the better portions almost every year, I am astonished. I have now a lot of corn growing, containing 13 acres, which is at least equal to any I ever saw, and two others not far inferior. As to the estimated produce, I will not say; nor do I bet or banter. But this I say, if any Virginian may this year grow more corn to the acre than I do, I will give him $10 for a bushel of seed.

The ground on which the first mentioned corn grows, had been cropped annually for about ten years, about half the time in corn, the balance in wheat or rye, but lightly manured; yet the crops, when not infested with insects, have been continually on the increase. It was ploughed to the depth of eight or nine inches three times, and harrowed as often before planting. The first ploughing was in July last, immediately after securing therefrom a crop of rye and oats, when it was also harrowed; the second ploughing was in December, when manure was spread, and not harrowed; the third was in March and beginning of April, and harrowed; and again harrowed the 18th or 20th April, and the corn planted. I will not say that all the insects are dead, but this I say, the corn is all alive, as a memorandum taken this day will show. July 15th, corn just beginning to tassel, from 8 to 10 feet high, large stalks, blades from 3 to 4½ feet long, and from 3 to 6 inches broad. The rows are 5 feet apart, stalks 10 inches apart, (or rather two stalks together 20 inches asunder.) This lot, as also my whole crop, was first tilled with the old Virginia coulter; second, the common cowtongue cultivator; third, the common Dutch shovel was run once on each side of the corn, and the cultivator in the centre; lastly, the cultivator, and my crop is clean.

My corn is a large and prolific kind, which being near the mountains induces me to plant late, otherwise my crops would be diminished by the increased shade of the taller growth. The uniformity of the growth in the field is not more pleasing than the uniformity of the produce; for it was originally from one ear; and I dare say if a late writer in the Register were to see my crop, he would not send to a Yankee for seed again. I have tried the genuine double-eared corn, which did not equal mine, and have again this year planted a small field with twins selected last fall from my own crop, but am very doubtful of improvement.

When I took up the pen, my principal object was to recommend to the public the culture of millet. Fessenden, in his 'Complete Farmer,' says "there are three kinds of millet," all of which are known to me, but that which is least known among us, and which is the true millet, grows about six inches taller than oats, with a larger stalk and blade, with the grain on the top, which is yellow, and about the size of the yellow mustard. This millet will grow on land of any quality, makes as good if not better hay than oats, and the yield is about double as great. The northern writers say that millet must be mowed; but from experience I can with equal propriety say it *must not* be mowed. I cradle it, cure, bundle, and cut in a box, as if it were oats. By this method of harvesting, I cut about four times as much as could be mowed. Being cut higher, the hay is better, it is cured quicker, cured better, and finally it is ready for the cutting box, out of which it comes as soft and as nice as heart could wish. If sowed for hay, I put on rich land about one bushel to the acre, and on ordinary land about half this quantity. If sowed for improvement, the same quantity as above. If for grain or seed, from half a bushel to a peck to the acre, according to quality. But one consideration which enhances the value of millet higher than all others combined, is this: if a field of wheat, rye, oats, corn, tobacco, or grass, from any cause may fail, the millet is ready to stand in its stead. It will come to perfection if sowed at any time between February and August, or two crops may be made on the same ground in the year, or the small grain stubbles may be ploughed down in July, and the millet sowed. My millet intended for seed is now heading, and from 2½ to 4 feet high, and I am yet sowing, either to be made into hay, or ploughed down for improvement, as I may determine.

In closing, I would remark that I would be thankful to some of those who are abusing the old Virginia method of harvesting corn, to instruct me how I am to shock (stack) my corn, which, when grown, will be from 12 to 17 feet high. And lastly, Mr. Editor, the day is excessively warm, and I am very nervous, therefore please excuse this scrawl, and if worthy of insertion in the Register, please correct errors. And yet one more word: there are in Amherst many better tracts of land than mine, but on these the general yield is less.

Amherst, July 15, 1840. ZA. DRUMMOND.

EXTRACT FROM PRIVATE CORRESPONDENCE, AND REMARKS THEREON.

* * * I have been truly surprised, not only that a single person, almost unaided, could sustain, with the success you have done, the interest of your paper, but how with any degree of capacity or diligence you could find the material, drawing so little as you do on former publications. * * * I regret that having been bred to a different trade, (and which you had the good sense to quit after a short trial,) I am not qualified to lend you assistance in your present better occupation. I think what I have gathered on a single subject from the Register, will bring me in (what I do not now care for a great deal) thousands of dollars, if I live a few years. * * * *

It is gratifying and soothing to feelings irritated by general indications of unappreciated services, and of our efforts to promote agricultural improvement being unaided, slighted, and disregarded generally, to receive such a testimonial as the above, proceeding from such a source. But while we cherish the compliment to our publication, we must, in frank-

ness and in truth, admit that it is not deserved. Though our correspondent deems that the interest of the Farmers' Register has continued to be fully sustained, *we do not*. And, indeed, how can it do otherwise than fall off in interest and in usefulness, when, as our correspondent truly says, it is left for support almost entirely to our own lights on agriculture, (feeble and limited as they are,) and our own efforts to collect and diffuse information. In the first commencement and establishment of this journal we proposed merely to furnish a channel of communication between farmers, and a depository for the results of agricultural investigation, experience and observation. Except as one among the many who by their pens could contribute to that fund, we did not expect, and certainly did not promise, to sustain such a publication as the Farmers' Register was designed to be—or even as it is, with all its admitted defects. Yet we are left almost unaided to bear the burden, and the responsibility. All our brother editors of agricultural journals seem to suffer under a like privation, if we may judge from the general want of matter in their pages, though they are not so regardless of policy as to complain in this manner.

We have never tired under the weight of editorial labors proper, and would rejoice, even in regard to our personal comfort and happiness, to have that weight increased greatly, as it would be, by more numerous communications. But we are indeed wearied, despondent, and almost ready to cease our long-continued efforts, and labors which were our most precious possession, when we see so little evidence, in general, of sympathy and of approbation, or of the will to render assistance, from the great body of Virginian agriculturists, who ought to consider the Farmers' Register, in its highest state of usefulness, as the best means of promoting both their own individual and common interests.—Ed. F. R.

INVESTIGATION OF THE EFFECTS OF MARLING.

For the purpose of obtaining from numerous and distinct sources opinions of the practical effects of marling, and especially of the oldest practice, we long ago prepared such queries as would embrace and exhibit the whole subject. These queries, together with a more fully explanatory circular letter, and remarks, were addressed to our readers generally, through the Farmers' Register, (at page 509, vol. v.) and also many separate copies were directed to particular individuals whom we had known, or heard of, as experienced in marling. The effort was vain. So very few persons answered the queries, or made the slightest effort to aid the attempt, that no use could be made even of the little that was performed. But though the effort was necessarily abandoned for the time, the much desired object was still kept in view; and, at the earliest time that we have been able to devote to it our personal attention, we have commenced seeking the information desired, by visiting in person the farms of the most experienced, or the most judicious, and, therefore, successful marlers, and taking down from their own words the answers to the queries. This renewed effort has been, as propriety dictated, directed first to Prince George county, the place of our own former labors, and the earliest in Virginia of this kind, that were continued and extensive, except in one other place, James City county. We are now engaged in this work, and hope to present answers from Prince George county in the next number of the Farmers' Register. Thence, if with sufficient prospect of success, we propose to visit other counties where marling has been long and successfully practised. We have been repeatedly and urgently invited to visit different regions with this view; and probably this annunciation, if standing alone, might induce a renewal of such requests. We therefore say, in advance, that we desire much to visit some of the marled lands in all the counties where the improvement has been extensive, and where important facts in regard to the effects may be learned. But it is impossible for us to give to that object so much of our time and labor. Therefore, in selecting the fewer places for personal examination, we shall be in a great degree guided by the attention that may be yet given to the queries formerly published, and the answers sent thereto previous to our visits. If any one person in each county will take the trouble of asking for, obtaining and writing down answers from a dozen individuals, the work thus executed and stated in advance of ours, would be a sufficient inducement for us to visit the ground and the individuals, for the purpose of completing what the preparatory labor had so far and so well forwarded in execution. All that was formerly desired, and which, if now performed, would furnish all the valuable statistical information on this subject needed, and so important to the public interests, is that a number of experienced marlers should take a few hours to consider and recollect, and write down their answers to the queries, so far as their experience or observation affords materials. But as it seems that it is hopeless to expect this of even half a dozen individuals, it will serve nearly as well if *one person* only in a county has sufficient zeal personally to make the queries of his

experienced neighbors, whom he could meet all at once on a court day. But if the somewhat greater trouble of separate answers being furnished was so great as to prevent compliance, or if the importance of the object was not appreciated, then it will be as much in vain to expect any aid in this respect, from any quarter, or in any easier mode. We can only say that without such aid from others, we can do nothing. But if such good aid is furnished as well may be, at the expense of but a few hours' attention from a few farmers in each marling county, then we will venture to promise to digest from these a body of information which, for its authority as well as for its facts, shall be of very great value to agricultural interests, and especially to those of the great marl region of the United States.—Ed. Far. Reg.

CRANBERRIES.

From the Maine Farmer.

The common cranberry is a native of Maine, growing spontaneously in many of our bogs and lowlands, and yet we presume that thousands of bushels are annually brought in from other states, and purchased by us.

We have found it growing near the coast, and have seen it also very abundant near the head waters of the Aroostook river.

There is no difficulty in cultivating them in the garden, if you have the conveniences for giving them a situation similar to the one which is natural to them. In England the horticulturists have succeeded in raising them in their gardens. Sir Joseph Banks describes his mode of cultivating them successfully. From a bed of 326 square feet three and a half bushels were produced.

It is necessary that they have a moist situation, and peat earth from bogs to grow upon.

Salisbury in the Horticultural Transactions gives the following directions for cultivating them in dry beds.

"The 'American cranberry,' says he, (*oxycoccus macrocarpa,*) may be cultivated very successfully in situations not positively wet, if only planted in bog earth, which retains moisture longer than any other soil; for a few plants even in pots which had stood some time neglected under a hedge, so that their branches were matted together, produced a plentiful crop."

In situations where water is to be had freely, Neill observes, "all that is necessary is to drive in a few stakes two or three feet within the margin of the water, and place of some old boards within them so as to prevent the soil of the cranberry bed from falling into the water; then to lay a parcel of small stones or rubbish in the bottom and put the peat earth or bog earth over it to the depth of about three inches above and seven inches below the surface of the water.

In such a situation the plants grow readily; and if the few be put in they entirely cover the bed in a year or two by means of their long runners which take root at different points.

From a very small space a very large quantity of cranberries can be gathered, and they prove a remarkably regular crop, scarcely affected by the state of the weather, and not subject to the attacks of insects."

A writer in Loudon's Gardener's Magazine observes that the cranberry will succeed when planted as an edging to any pond, provided some bog earth, be placed for its roots to run in; or if a bed of bog earth be sunk in any shady situation, so as its surface may be below the general level, for the sake of retaining water, the plant will thrive well, and if watered regularly in dry weather, produce abundant crops.

In addition to the common bog cranberry, we have another one that grows on our highest mountains evidently seeking the coldest and most exposed situation that can be found. This is sometimes called the Scotch cranberry, and sometimes "Mountain cranberry." The botanical term is (*Vaccinium vitis idæ.*) The berry does not grow so large as the other, but it is a very pleasant tart. It may be found nestling among the moss and alpine plants of the White Hills and many other of the lofty peaks in Oxford County. This can be easily cultivated by giving it a bed of peat earth or moss in some cool shady situation.

Besides these, we have another fruit which is also called "cranberry," or more commonly "high cranberry." It is a species of viburnum, (*viburnum oxycoccus,*) and is a very ornamental shrub and should be found in every gayden or door yard. It is quite abundant in many parts of the state, especially in Oxford County, and on the Sandy river, Kennebec, Aroostook, &c. &c. It grows about ten feet high, and is easily propagated by the root or seed. We have also succeeded well in propagating it by cuttings, though these should be protected during the winter, as the roots do not acquire sufficient strength to hold the plant firmly into the sward, and there is danger of its being thrown out by the frost if there are not some leaves or straw thrown over them.

This shrub bears clusters of red berries which remain on the bushes nearly all winter. It is a pleasant acid and makes fine preserves. The only objection being the stone or kernel is rather large in proportion to the size of the berry.

CLOVER IN CORN.

From the Farmers' Cabinet.

Sir—In a late conversation with a first-rate agriculturist, and a member of the state senate, I found that he is accustomed to sow a full crop of red clover in his corn, at the time of the last cleaning, laying the land as level as possible for this purpose; and he assured me he had always succeeded in obtaining heavy crops, without the least injury to the corn, and which, in its turn, shelters the clover by its shade, and encourages a very rapid growth. Will our friends try it by way of experiment the present season? It is believed that it may be made introductory to a new course of crops, which might relieve the country from that terrible scourge, blight, in all its different varieties, fly, rust, smut, mildew, &c., which is supposed in a great measure attributable to the present mode of cropping and manuring. D. H.

Philadelphia, June 24, 1840.

HUNTING A NEGRO SLAVE IN NEW HAMPSHIRE.

From the Concord (N. H.) Patriot.

Our village was thrown into confusion on Thursday last by the escape and subsequent capture of a runaway slave. Not, however, by those "monsters in human form," "slaveholders," nor yet "pro-slavery northerners," but by veritable abolitionists, who are as they term themselves, the "exclusive friends of the poor down-trodden slave." The slave has been harbored or rather confined here for a few days past, and is supposed to be one of the gang recently landed in the vicinity of Newburyport, and who are now prowling about the woods there, greatly to the terror of the female portion of the community. If we may believe the abolitionists, he is to be sent towards Canada, as soon as sufficient money and clothing can be furnished for the purpose. Meantime, if the assertions of our most respectable citizens are worth any thing, he is forced to submit to a drudgery here, compared with which the tyranny under which he suffered beyond the Potomac, is not a circumstance. The conduct of the slave confirms this. *Actions* speak louder than *words*.

On the above mentioned day, he escaped from "durance vile," and taking the road over the Free Bridge, run for the woods, was pursued, captured, and placed in a wagon to be brought back. When within one mile of the village the carriage was upset, one of the men was severely injured—the horse came dashing at full speed into the village with the fore wheels of the wagon, and the slave again took to his heels. He fled with the speed of a frightened deer, but with far less discretion. He made tracks across the interval towards the village, pursued by all the men and boys who could be induced to join in the chase; was recaptured, collared by the editor of the Herald of Freedom, and dragged through the streets to the abolition head-quarters, where it is said he was tied up in a barn with a rope. It is said he wishes to get back to his master, realizing probably for the first time the truth of the couplet

"Tis better far to bear the ills we feel,
Than fly to others that we know not of."

His captors are a class of abolitionists, yclepped non-resistants, non-governmentists, &c. The consistency of their course, to say nothing of the right thus to harbor a man contrary to the laws of the land, or to detain him against his own wishes, passeth our comprehension. "But there are many things in heaven and earth not dreamed of in our philosophy."

MONTHLY COMMERCIAL REPORT.

The dull season in commerce has now arrived; but in Virginia, the succession of crops keeps up some activity in business during nearly the whole year. Tobacco has been the engrossing article for some weeks or months past, and is now about to be succeeded by the new crop of wheat. There is little change to notice in the price of any article during the month. Supplies of tobacco continue large, and prices remain steady. Lugs 3¾ to 4½, common leaf 5 to 6½, and better sorts 7 to 10, with higher rates for fancy qualities. Many vessels are now loading in James river for various ports in Europe.

As is invariably the case every year toward the approach of harvest in England, the state of the weather that prevailed at the latest dates influences our markets: clouds create speculation, and sunshine destroys it. The steamers reported bad weather at the commencement of this month, and a small advance in the price of wheat and flour is the consequence. The frequent rains here have somewhat retarded the thrashing of wheat, the price of which is about a dollar, and some sales at $1 05. Canal flour, $4¾; Richmond city mills, $5¾, for export to South America. Corn, 48 to 50 cents. Exchange on England has declined to 10½ to 11 per cent. premium, and on New York to ¾ to 1½.

X.

July 25, 1840.

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